THE MARK-8 USER GROUP IS ALIVE AND RUNNING. IT'S ONLY 14 SEPT. AND WE ALREADY HAVE RECEIVED LETTERS FROM 30 PEOPLE. IT IS QUITE POSSIBLE THAT WE MAY END UP WITH HUNDREDS OF PARTICIPANTS. THIS ISSUE WILL INCLUDE A FEW THINGS THAT SEEM URGENT AND WE'LL SAVE THE GOOD THINGS FOR FUTURE ISSUES AFTER WE ACCUMULATE SOME MORE PARTICIPANTS.

1. HOW DO YOU KEEP FROM PAYING $120 FOR THE 8008 CHIP?
   A. GET A SCHOOL DISCOUNT OF 20% FROM AN INTEL DISTRIBUTOR.
   B. TRY COOK, 25W178-39TH ST., NAPERVILLE, IL 60540 $80 (P. 110 RE OCT)
   C. BEG RGS ELECTRONICS, 3650 CHARLES ST., SUITE K, SANTA CLARA, CA 95050 TO STOCK THEM AGAIN AT $50. I GOT 2 FROM THEM BUT THEY SAY THEY ONLY HAVE ENOUGH LEFT FOR THEIR IK 8008 KIT. SEE P. 102 RE OCT AND 73 MAGAZINE P. 87 JUNE.
   D. TRY BILL GODBOUT ELECTRONICS, BOX 2673, OAKLAND AIRPORT, CA 94614 $50, SEE AD IN 73 MAG. P. 87, JUNE 74.

2. HOW MANY BUGS ARE THERE IN THE CONSTRUCTION ARTICLE?
A FEW HAVE SHOWN UP SO FAR. J. TITUS, THE AUTHOR MENTIONS THESE:
   A. CONNECTIONS ON BOTTOM OF BOARD ARE IN PARALLEL. ARRANGE BOARDS IN ORDER SHOWN IN BOOK AND WIRE. THEN CUT OUT WIRES BETWEEN CONTACTS 9 THRU 16 BETWEEN INPUT MUX AND ADDR/MANUAL BOARDS.
   B. ON PAGE 6, 4TH PARAGRAPH, LAST LINE, IT SHOULD READ "ON THE FOLLOWING INSTALL THE B JUMPERS AND RESISTORS R1-R4 AND R21."

PLEASE REPORT ANY OTHER BUGS OR CONSTRUCTION PROBLEMS YOU FIND.

3. HOW DO YOU REMOVE AN IC FROM THE PC BOARDS WITHOUT REMOVING THE FOIL TOO? I GIVE UP, HOW? EVEN MOLEX IC SOCKET PINS ARE HARD TO USE ON THE MEMORY BOARDS. IF ONLY THE COMPLICATED FOIL PATTERNS COULD HAVE BEEN ON THE BOTTOM SIDE INSTEAD OF THE TOP SIDE OF THE BOARDS.

4. WHAT DO YOU DO IF YOU WANT MORE INPUT PORTS?

A. USE J. TITUS'S BUS IDEA ON PAGE 9 AND 10.

B. REWIRE THE INPUT MUX BOARD AS SHOWN IN FIG. 1 FOR AN INPUT BUS EITHER TRI-STATE OR WIRED-OR.

C. IF YOU NEED MORE THAN 8 INPUT PORTS, TRY THIS. THE AC COMES OUT AT T1 OF MEM CYCLE 2 ON AN INP INSTRUCTION. I BELIEVE IT WILL BE LATCHED INTO IC-8&9. BY INCLUDING THE PROGRAMMING INSTRUCTIONS

```
LAI     (LOAD IMMEDIATE)
15      (DEVICE NUMBER)
INP B   (PORT BEING MULTIPLEXED)
```

AND USING A 7442 OR 74154 TO DECODE THE AC INFO, YOU CAN HAVE AS MANY INPUT PORTS AS YOU WANT. (MORE ABOUT THIS IN A FUTURE ISSUE.)

5. HOW DO I CONNECT A TELETYPE? A SCHEMATIC IS SHOWN IN FIG. 2.

6. HOW DO I BUILD A MODEM FOR A CASSETTE RECORDER? A GOOD QUESTION. HERE ARE TWO UNTRIED PARTIAL CIRCUITS I'VE FOUND. IF ANYONE HAS BETTER INFORMATION, PLEASE GET IT TO US SO WE CAN DISTRIBUTE IT. THIS SEEMS TO BE EVERYONE'S TOP PRIORITY PERIPHERAL.

7. HOW CAN I GET HELP OR MORE INFORMATION ON CONSTRUCTING MY MARK-8 OR HELP IN DEBUGGING? HEAD OUT TO THE NEAREST ENGINEERING COLLEGE. EVERY ONE HAS A WHOLE BUNCH OF MICROPROCESSOR PROJECTS GOING ON AND CAN PROBABLY HELP YOU OUT WITH DEBUGGING, SOFTWARE, AND ROM PROGRAMMING, ETC. LET THE REST OF US KNOW WHAT YOU FIND OUT.

8. WHAT HAVE THE PARTICIPANTS SAID SO FAR?
JIM FRY IS DEVELOPING A CURSOR BOARD FOR TV TYPEWRITER WITH PROGRAMMABLE CURSOR CONTROL AND IS TRYING TO IMPLEMENT AN ELABORATE INTERRUPT CAPABILITY.

GREG HUNTZINGER IS GOING TO USE THE MICRO-8 AND TV TYPEWRITER AS A TV TITLING SYSTEM FOR TV TAPING AND FOR COMPUTER ART.

ROBERT KELLY HAS 2 BAUDOT TTY'S HE WANTS INFO ON USING.
K. A. MCGINNIS WANTS TO OBTAIN CHEAP WIRE WRAP SOCKETS. HE ALSO WANTS TO KNOW IF ANYONE IS INTERESTED IN BUILDING 8080 BASED COMPUTERS. I AM IS ANYONE ELSE?

LAURENCE PLATE IS READY TO WRITE A BASIC AND WANTS TO INTERFACE A TRIG CALCULATOR

TERRY RITTER IS THE FIRST ONE TO SAY HIS MARK-8 IS RUNNING AND HAS SOME NEAT IDEAS ON PERIPHERALS.

LEE SORENSEN SAYS THE SCELBI-8H USER MANUAL (P. 101 RE OCT 74) IS VERY VALUABLE.

JONATHAN TITUS, THE MARK-8 AUTHOR IS GOING TO CONTRIBUTE INFO ON A REMOTE INTERRUPT MODULE AND A 2102 RAM MEMORY . HE ALSO TELLS US THAT HE HAS A CALCULATOR INTERFACE ARTICLE SCHEDULED FOR RE IN THE NEXT COUPLE OF MONTHS.

9. WHAT IS THE CABRILLO COMPUTER CENTER? WE ARE THE EDUCATIONAL COMPUTER INSTALLATION FOR CABRILLO HIGH SCHOOL. WE PRESENTTLY HAVE A 4K PDP8/E WITH A 32K DISK, OPTICAL MARK SENSE CARD READER, 2 TTY'S, A CENTRONICS 508 LINE PRINTER (DUE ANY DAY), A HOMEMADE PAPER TAPE READER AND PUNCH, HOMEMADE OSCILLOSCOPE GRAPHICS TERMINAL, AND A HOMEMADE SWITCH RELAY INTERFACE. WE WILL SOON BE EXPANDING TO A PDP-8/E ETOS 6 USER MULTILANGUAGE OS-8 TIME SHARE SYSTEM. WE WILL HAVE A COUPLE OF HOMEMADE 8008 SYSTEMS RUNNING SOON AND THE EE DEPARTMENT AT UNIV OF CA AT SANTA BARBARA IS INVESTIGATING THE POSSIBILITY OF LOANING US ONE OF THEIR VERY ELABORATE 8008 TRAINING SYSTEMS FOR EVALUATION IN THE HIGH SCHOOL ENVIRONMENT.
10. WHAT CAN WE EXPECT FROM THE NEWSLETTER IN THE FUTURE? NOTHING!!! UNLESS YOU ARE WILLING TO CONTRIBUTE. I AM WORKING ON: 1) OBTAINING INFO ON SOFTWARE SOURCES. 2) GETTING PERMISSION TO RELEASE A BUNCH OF INFO FROM LAWRENCE RADIATION LABS. 3) A CONSTRUCTION ARTICLE ON MY SPECIALITY, $75 HIGH SPEED PAPER TAPE READERS 4) A CONSTRUCTION ARTICLE ON A SCOPE GRAPHICS TERMINAL. WE NEED BADLY: 1) MODEM INFO FOR CASSETTE RECORDERS. 2) SOURCES OF TTY'S CHEAP. 3) INFO ON THE RELIABILITY OF VARIOUS DISCOUNT IC SUPPLIERS. 4) CIRCUITS FOR CONVERTING BAUDOT TO ASCII AND VICE VERSA FOR CHEAP TTY'S. 5) MODIFICATIONS TO TV TYPEWRITER TO INCLUDE SCHROLLING. PLEASE CONTRIBUTE A FEW MINUTES OF YOUR TIME TO SEND IN ANYTHING THAT OTHER BUILDERS MIGHT BE INTERESTED IN. DON'T LET THIS NEWSLETTER DIE LIKE SO MANY OTHERS HAVE BECAUSE OF THE PARTICIPANTS RELUCTANCE TO CONTRIBUTE.

GOOD LUCK IN DEBUGGING AND MAY YOUR SOLDER BRIDGES BE FEW AND FAR BETWEEN.
KEEP THOSE CARDS AND LETTERS COMING IN.

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MARK-8 USER GROUP EDITOR
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2524 GLEN SPRINGS WAY
78741

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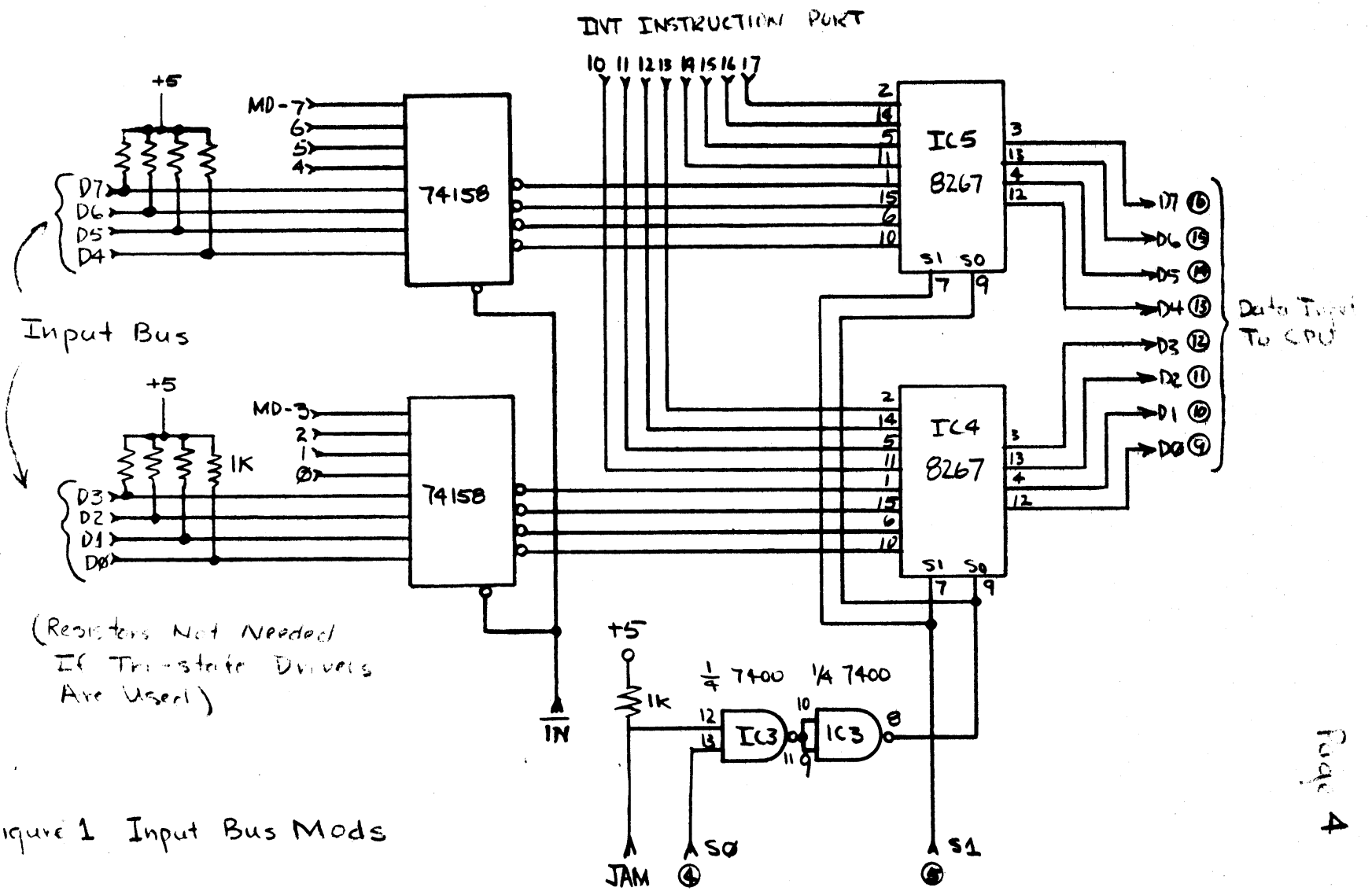


Figure 1 Input Bus Mods

Figure 2 TTY Connection

Pin # 36 L One Stop Bit
H Two Stop Bits

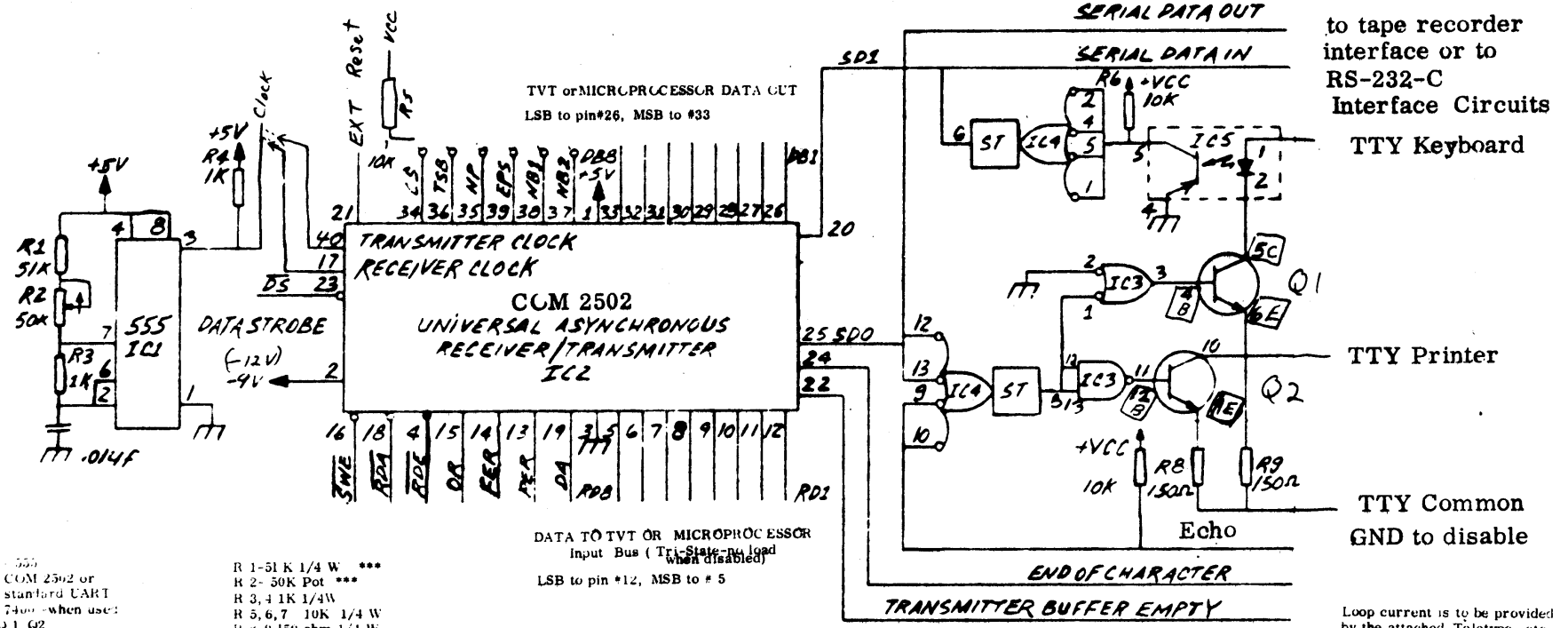
No. of Data Bits
5 #37L, #38L
6 #37L, #38 H
7 #37H, #38L
8 #37H, # 39H

PARITY
#35 H No Parity
#39 L Odd Parity
#39 H Even Parity

Connect pins to Gnd for L; to VCC for H, through 10K, R-5
(Hardwire, use on board switchs, bring to control panel direct, or use gates)

ADDITIONAL IC's MIGHT BE NEEDED TO CUSTOMIZE UART CIRCUIT TO INDIVIDUAL NEEDS (OR gates, inverters, etc.)

#23 Transmitter Data Strobe - L enters data into transmitter buffer- such as keyboard strobe, processor output port strobe, etc.



IC 1 - 555
IC 2 - COM 2502 or other standard UART
IC 3 - 7400 when used with Q 1, Q2 Otherwise 75450
IC 4 - 74L
Optional
IC 5 - 555 (for a second clock rate)
IC 6 - 7400 /7408 if added gating or inversion desired
Q1, 2 - 2N3643 or 2N2222 or other NPN
(12B, 10C, 9E, etc. refers either to pin number on 75450 or base, collector, and emitter of transistor.)

R 1-51 K 1/4 W ***
R 2- 50K Pot ***
R 3, 4 1K 1/4W
R 5, 6, 7 10K 1/4 W
R 8, 9 150 ohm 1/4 W

C 1, 2 1mfd 25-50V (bypass across both power supplies)
C 3 .01 timing cap ***
C4, 5, 6, 7 .01 discs (across VCC-GND at each IC)
*** Change if needed for higher Baud rates.

#21 Master Reset, needs to be pulsed high after system turn on(to be controled by system initialize)
#19 RDA, (Tri-state) is H when data is avavailable at receiver(#5- #12)
#18 RDAR a L clears the RDA flag
#4 RDE when brought to L, enables tri-state output of Receiver, #5-#12
#13, #14, #15 are error flags (for visual indicators, or software messages to processor)
#16 When at L, enables above, RDA, TMBT, and would normally be tied to ground

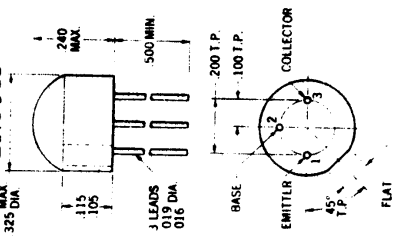
*NOTE- Normal supply voltages, VCC, #1, 5V, VDD, #2, -12V, Gnd, #3. VDD may be -9 if Baud rate doesn't exceed 10K (normal uses it won't) and strobes are in the order of 1 us.

Baud rate should be adjusted to 16 X

Clock rate (output of 555, pin #3) should be adjusted to 16 X the desired Baud rate, and is connected to UART pins #17, #40 if the receiver and transmitter are to be operated at the same Baud rate. Of course, if additional Baud rates are desire arrange for additional 555's or to switch timing components.

Loop current is to be provided by the attached Teletype, etc.

PHYSICAL DIMENSIONS
Epoxy package
TO-105
2N3643



FSK DATA CONVERTER FOR CASSETTE RECORDER

A circuit scheme which allows an ordinary reel or cassette tape recorder to be used as a digital data recorder was submitted by Daniel Chin of Burlington, Massachusetts.

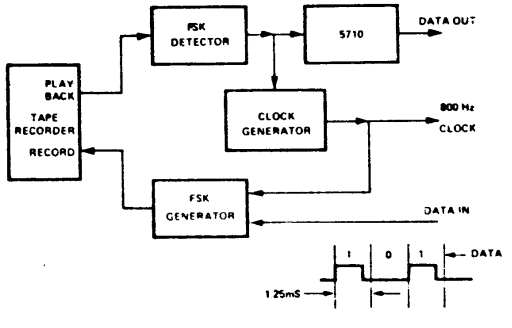
"The circuit design allows any single-track audio tape recorder with frequency response to 7kHz to be used as a digital recorder for many non-critical applications. This application provides a complete data recording system using two recorded frequencies on a single track. The two frequencies are obtained from two synchronized NE565s. Detection of the recorded frequencies requires a third NE565. A fourth circuit is used to generate and synchronize the system clock. The advantages obtained by using these techniques are elimination of the need for:

1. A timing channel to strobe off the data, or
2. A third frequency for null, while using the other two frequencies for 1 and 0.

This implementation, therefore, is one of the simplest ways to get a digital recording system on an audio recorder. It is shown in block diagram form in Figure 8–75.

The parameters chosen for the circuit design allow a digital recording bit rate of 800Hz or 100 8-bit characters per second. Though 100 characters per second is less than the 300-character-per-second speed of a high-speed paper tape reader, the low cost of this circuitry combined with the audio tape recorder should make this system very attractive from a cost performance viewpoint. This is especially true when compared with the normal Teletype speed of 10 characters per second.

BLOCK DIAGRAM OF PLL CASSETTE RECORDER



The circuits will also work with the readily available low cost cassette recorders now available, which make compact as well as low cost information storage. A FSK system of recording is used, which allows the voice recording and reproduction electronics of the recorder to be unmodified for use in recording digital information. The retained electronics may also be used to record voice message identification of the various sections of the tape.

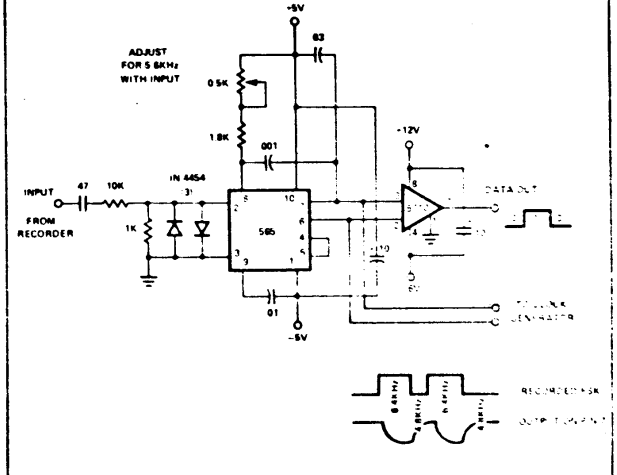
The intended use of this circuit is to convert an audio recorder for minicomputer programs written for engineering design applications. Such an application requires good information storage and retrieval over a wide range of storage time. Redundancy may be incorporated by using a two-channel recorder (stereo) and a FSK detector per channel. The outputs of the two detectors could then be ORed digitally to recovered recorded 1s and, thus, give a safeguard against dropouts.

Circuit Description

Four NE565s are used in three circuits to achieve the design. These are:

The FSK detector (Figure 8–76a) is used to detect 6.4kHz for a 1 and 4.8kHz for a 0. The data output is taken from a 5711 connected to pins 7 and 6 of the NE565. The recording method used is RZ FSK, which means that a zero is recorded as 4.8kHz for the entire bit period and one is recorded as 6.4kHz for about 60 percent of the period and 4.8kHz for the remaining 40 percent of the period. This 60 percent bit duty cycle insures that the clock will synchronize with a negative transition during the time that a 1 should be detected.

CASSETTE RECORDER FSK DETECTOR, CLOCK GENERATOR AND FSK GENERATOR



PHASE LOCKED LOOP APPLICATIONS

The clock generator (Figure 8–76b) is used to derive the 800Hz with no input. When the data pulses are extracted from the recorded data, the clock is synchronized to the data. The design allows up to 7 zeros in succession without causing the clock to go out of synchronization. This condition is easily met if odd parity is used to record the 8-bit characters. (One of the 8 bits is a parity bit and, thus, one bit out of 8 is always a one.)

The FSK generator (Figure 8–76c) provides the FSK signal for recording on tape. It consists of 2 oscillators locked to the basic 800Hz system clock but oscillating at 6.4kHz and 4.8kHz. The incoming data to be recorded selects either oscillator as the frequency to be recorded. Harmonic suppression of the square wave output is taken care of automatically by the high frequency roll off characteristic of the tape recorder."

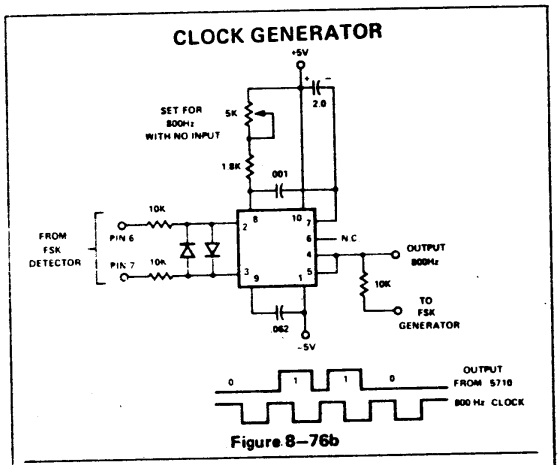


Figure 8–76b

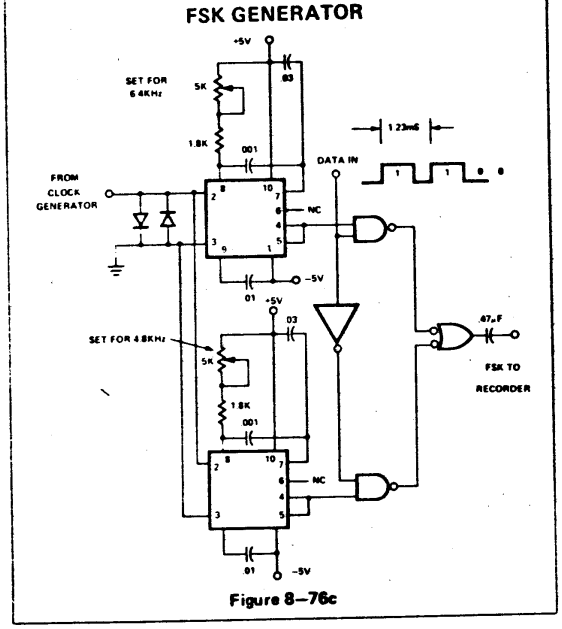


Figure 8–76c

filter is formed by connecting a capacitor or an RC network from pin 2 to ground, as shown in Figure 16. The resulting filter transfer functions are also shown in the figure where R_1 (= 6 kΩ) is the internal impedance at pin 2. In this application, pin 3 is ac grounded through a bypass capacitor, C_B, to insure proper ac bypass ($C_B \geq 10\ C_1$).

In high frequency applications ($f_o > 100$ kHz) for FM demodulation, tone detection and frequency synthesis, it is recommended that pin 3 not be bypassed but connected to ground through a low-pass filter identical to that used at pin 2 (See Figures 22 and 23).

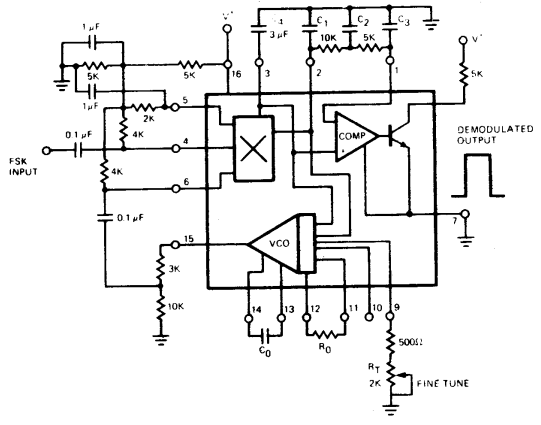


Figure 17. Circuit Connection For FSK Demodulation (Single Supply)

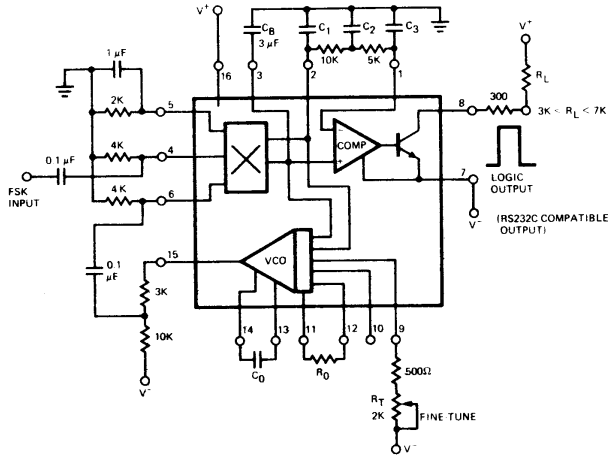


Figure 18. Split-Supply FSK Demodulation with RS232C Compatible Output

APPLICATIONS INFORMATION

FSK DEMODULATION

Figures 17 and 18 show a generalized circuit connection for FSK demodulation. The circuit is connected as a PLL system by ac coupling the VCO output (pin 15) to pin 6. The FSK input is applied to pin 4. When the input frequency is shifted, corresponding to a data bit, the polarity of the dc voltage across the phase detector outputs (pins 2 and 3) is reversed. The voltage comparator and the logic driver section convert this dc level shift to a binary pulse. One of the phase detector outputs (pin 3) is ac grounded and serves as the bias reference for the voltage comparator section. Capacitor C_1 serves as the PLL

loop filter, and C_2 and C_3 as post-detection filters. The timing capacitor, C_0, and the fine-tune adjustments are used to set the VCO frequency, f_0, midway between the "mark" and "space" frequencies of the input signal. Typical component values for 300 baud (103-type) and 1200 baud (202-type) MODEM applications are listed below:

OPERATING CONDITIONS	TYPICAL COMPONENT VALUES
300 Baud	
Low Band: f_1 = 1070 Hz	R_0 = 5.1 kΩ, C_0 = 0.22 μF
f_2 = 1270 Hz	$C_1 = C_2$ = 0.047 μF,
	C_3 = 0.033 μF, C_4 = 3 μF
High Band: f_1 = 2025 Hz	R_0 = 8.2 kΩ, C_0 = 0.1 μF
f_2 = 2225 Hz	$C_1 = C_2 = C_3$ = 0.033 μF
1200 Baud	R_0 = 2 kΩ, C_0 = 0.14 μF
f_1 = 1200 Hz	C_1 = 0.033 μF, C_3 = 0.02 μF
f_2 = 2200 Hz	C_2 = 0.01 μF, C_4 = 0.1 μF

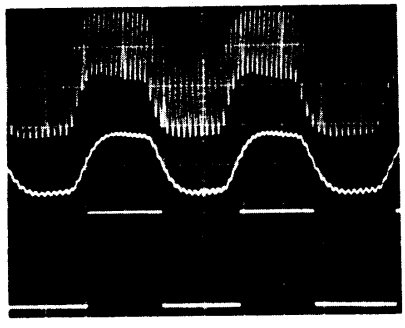


Figure 19. Demodulated Waveforms for 150 Baud Data Rate, f_1 = 1070 Hz, f_2 = 1270 Hz

Top: Pin 2 } 0.5 V/div.
Center: Pin 1 }
Bottom: Pin 8 5.0V/div.

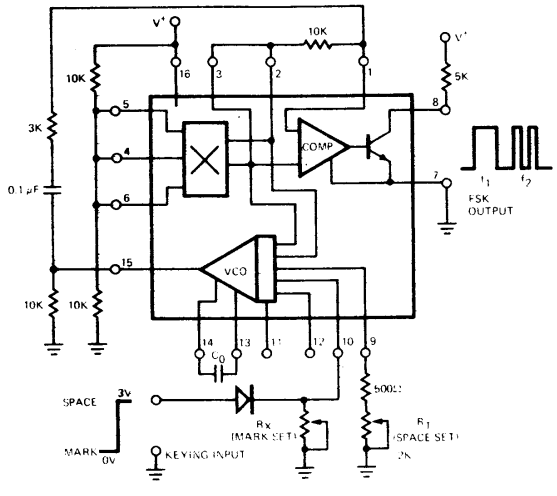


Figure 20. Circuit Connection For FSK Generation (<100kHz)

Figure 19 shows typical waveforms at different points in the circuit for a 150 baud data rate with "mark" and "space" frequencies of 1270 and 1070 Hz respectively. The top waveform is the phase detector output at pin 2; the middle waveform is the filtered signal at the comparator input (pin 1), and the bottom waveform is the logic output at pin 8.

RS-232C COMPATIBLE OPERATION (See Figure 18): For split-supply operation, the logic output section can function as a line-driver circuit, compatible with RS-232C specifications. This can be achieved by connecting a 300Ω series resistance to pin 8, and choosing a pull-up resistor R_L in the range of 3 KΩ to 7 KΩ.

ENABLE/DISABLE CONTROLS: In FSK demodulation applications, the operation of the circuit can be "inhibited" by applying a disable logic signal to either pins 2, 3 or 5. Application of a *negative* inhibit pulse to pin 3 introduces a dc offset across the comparator inputs and sets the logic output (pin 8) to a "high" state. If the same pulse is applied to pin 2, then a "low" state occurs at pin 8. Applying either a 3-volt *positive* or *negative* "inhibit" pulse to pin 5 disables the phase detector section, and sets the logic output to a "low" state. The enable/disable controls are particularly useful when using the XR-210 in a carrier-level detection system. Here the circuit can be activated only when the input signal exceeds a pre-set threshold value.

FSK GENERATION

A typical circuit connection for this application is shown in Figure 20. The coarse setting of the frequency is determined by the choice of C_0 across pins 13 and 14. Normally, C_0 is chosen to give a free running frequency, f_0, approximately 5% lower than the "space" frequency, f_1. Then, the "space" and "mark" frequencies f_1 and f_2 are set by the choice of resistors R_T and R_X as:

$$f_1 = f_{space} = f_0\left(1 + \frac{0.1}{R_T}\right) \quad \text{Hz}$$

$$f_2 = f_{mark} = f_1\left(1 + \frac{0.3}{R_X}\right) \quad \text{Hz}$$

where the resistor values are in kΩ. "Space" frequency is set prior to the "mark" frequency with the selection of C_0 and the fine-tune resistor, R_T, with pin 10 open circuited. "Mark" frequency is then determined by the appropriate choice of R_X from pin 10 to ground.

The VCO output available at pin 15 is a symmetrical square-wave with a 2.5 V_{p-p} output amplitude. The duty cycle asymetry of the VCO output is typically less than 2%.

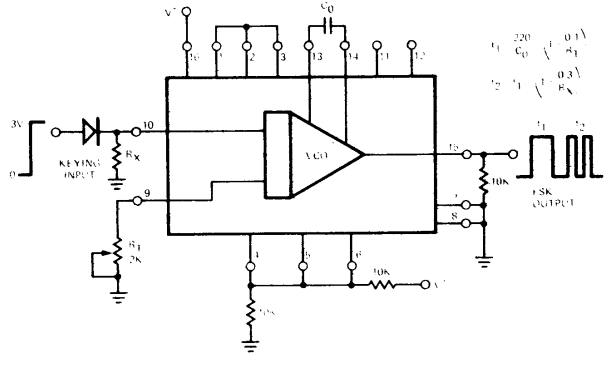


Figure 21. High Frequency FSK Generation Using VCO Section Only

MAIL FOR THE USER GROUP HAS BEEN ARRIVING AT A RAPID RATE. WE NOW HAVE 100 PARTICIPANTS AND 5 TO 10 NEW LETTERS ARRIVE EVERY DAY. IT HASN'T BEEN EASY KEEPING UP, SO THE MAJORITY OF THIS NEWSLETTER WILL BE A ROSTER WITH COMMENTS FROM THE PARTICIPANTS.

#1. BUGS IN CONSTRUCTION ARTICLE OR ON PC BOARDS.
SEE NEWSLETTER #1 AND NOTE THE FOLLOWING:
A) ON LED REGISTER BOARD, C2 GOES FROM B+ TO B+ AND SHOULD GO FROM B+ TO GND.
B) ON ADDRESS LATCH BOARD, THERE SHOULD BE A JUMPER FROM IC1 PIN 5 TO IC2 PIN 1.
C) ON MEMORY BOARDS, DO NOT PUT FRONT TO BACK JUMPERS IN HOLES SHOWN BELOW EVEN THO THE HOLES ARE DRILLED SINCE YOU WILL SHORT OUT THE MEMORY OUTPUT LINES.

#2. SOURCES FOR OBTAINING 8008.
A) BILL GODBOUT - TERRY RITTER WAS VERY PLEASED - SEE ROSTER.
B) RGS ELECTRONICS - $75, SEE ROSTER.
C) ELECTRONIC COMPONENT SALES - VERY QUESTIONABLE, IF THEY EXIST AT ALL. PRESENT INFO INDICATES OPERATOR OF COMPANY HAS 12 ALIASES AND HAS SWINDLED PEOPLE FOR OVER $400,000 BUT SOME MATERIAL IS BEING DELIVERED NOW AND A FEW PEOPLE HAVE REPORTED REFUNDS.
D) M&R ENTERPRISES, P.O. BOX 1011, SUNNYVALE, CA 94088 8008 CPU $60, CPU, ALL RESISTORS AND CAP FOR MARK-8 AND 15 7400'S, $75.
E) ROBERT W. COOK - SEE HIS LETTER IN LAST PART OF NEWSLETTER.
F) SEE MARTIN RESEARCH DATA IN BACK OF NEWSLETTER.
G) JAMES S. HEATON CO, INC. 3772 KATTELLA AVE., LOS ALAMITOS, CA 90720 DISTRIBUTOR FOR MICROSYSTEM INTERNATIONAL'S MF8008R 2ND SOURCE CHIP @ $95 BUT WRITE FOR SINGLE UNIT PRICE.
H) KA COMPONENT SALES - SEE FLYER IN BACK OF NEWSLETTER -- NOTE THAT NEW 8008 CPU PRICE IS $66.
H) ELECTRONIC DISCOUNT SALES, 138 N. 81ST ST., MESA, ARIZONA 8008 CPU FOR $59.45

#3 SOURCES OF OTHER COMPONENTS
A) SEE S. LIEBERMAN'S APPRAISAL OF HOBBY IC SUPPLIERS IN ROSTER.
B) SEE FLYER PROVIDED BY KA ELECTRONICS IN BACK OF NEWSLETTER.
C) FOR MOLEX CONNECTORS TRY FORCE ELECTRONICS, 343 HINDRY AVE., INGLEWOOD, CA 90301
D) SIGNETICS IC'S, HAMILTON ELECTRO SALES, 10912 W. WASHINGTON BLVD., CULVER CITY, CA 90230, 213-870-7171. WRITE THEM AND YOU WILL NEVER RECEIVE AN ANSWER - TELEPHONE AND YOUR IC'S WILL BE SENT OUT COD UPS THAT SAME DAY.

#4 KITS
IF ANYONE HASN'T BOUGHT PARTS YET, IT WOULD BE WORTH SERIOUSLY EVALUATING RGS ELECTRONIC'S KIT, INFO IN BACK OF NEWSLETTER OR THE SCELBI, SEE ROSTER AND INFO IN BACK. I'D VERY MUCH LIKE TO SEE THEIR MANUALS BUT AM UNWILLING TO SPEND THE MONEY. IF ANYBODY WOULD LOAN ME A COPY FOR A COUPLE OF DAYS I'D APPRECIATE IT.

#5 OUTSTANDING NEWS

A) A CALCULATOR INTERFACE ARTICLE IS SCHEDULED FOR RE IN SEVERAL MONTHS BY J. TITUS.

B) A CASSETTE TAPE UNIT FOR THE TV TYPEWRITER (TVT) IS SCHEDULED FOR THE JANUARY RE BY ROGER L. SMITH.

#6 CASSETTE TAPE INTERFACE

MAYBE MR. SMITH'S ARTICLE WILL SOLVE OUR PROBLEMS. I'LL KEEP COPYING ARTICLES UNTIL THEN. ROBERT COOK SENT IN THE REPRINT OF THE SIGNETICS FSK CIRCUIT AND THE ECONOMY MODEL TAPE SYSTEM CIRCUIT REPRINT.

#7 TTY INTERFACE

ROBERT COOK SENT IN THE CIRCUIT REPRINT INCLUDED. ALSO INCLUDED IS A REDRAWING OF THE ILLEGIBLE CIRCUIT PRINTED IN THE LAST ISSUE.

#8 STANDARDIZATION

WHAT A TOUGH ONE THIS IS! PLEASE SEND IN ANY AND ALL COMMENTS. IT IS ESSENTIAL THAT WE GET SOMETHING ESTABLISHED SOON FOR:

1) TTY INTERFACE INCLUDING PAPERTAPE FORMAT
2) TVT INTERFACE 3) CASSETTE TAPE INTERFACE
4) HIGH SPEED PAPER TAPE READER AND PUNCH INTERFACE
5) SCOPE GRAPHICS TERMINAL DRIVER 6) A/D AND D/A INTERFACES
7) SWITCH-RELAY INTERFACE 8) PROGRMMMABLE TIMER
9) ETC

SOME OF THIS WILL BE FORCED BY: 1) INTEL 2) RGS 008A
*3) SCELBI COMPUTERS 4) PRO LOG CORP., 852 AIRPORT ROAD, MONTERY, CA 93930
5) DIGITAL EQUIPMENT CORP., MAYNARD, MASS 01754
6) PLEASE REPORT OTHER MANUFACTURERS USING 8008 CHIPS.
7) LARGE USERS OF 8008 SYSTEMS SUCH AS: LAWRENCE RADIATION LABS, LIVERMORE, CA

THE PROBLEM IS TO OBTAIN AND SORT THRU ALL OF THIS, SEE HOW IT TIES IN TO THE MARK-8 AND ESTABLISH SOMETHING QUICK. IT SEEMS THAT THERE ARE TWO STANDARD CONFIGURATIONS WE MUST DEAL WITH: 1) MARK-8 BUILT EXACTLY AS SPECIFIED IN THE RE ARTICLE. 2) MARK-8 MODIFIED TO INCLUDE EXPANDED I/O CAPABILITY.

I'D LIKE TO PROPOSE THE CONFIGURATION SHOWN IN FIGURE 1 AS THE I/O MODIFIED STANDARD. THIS IS LIKE THE POPULAR CONFIGURATION IN USE BY THE HUNDREDS AT LAWRENCE RADIATION LABS. THEY HAVE STANDARD MODULES, CHASSIS, ETC. FOR THS CONFIGURATION AND AN ENORMOUS AMOUNT OF STANDARD SOFTWARE. EXAMPLE: A 256 WORD PROM THAT GIVES COMPLETE TTY CONTROL OF THE 8008 FEATURING: OCTAL LOADING OF H & L, 2) EXAMINE AND DEPOSIT FROM KEYBOARD INTO MEMORY 3) START APROGRAM IN MEMORY 4) LOAD A PROGRAM FROM PAPER TAPE (WHO NEEDS A FRONT PANEL?) I HAVE THS ONE AND AM TRYING TO GET FORMAL APPROVAL TO RELEASE IT.

ANOTHER CONFIGURATION TO LOOK AT WOULD BE INTEL'S INTELLEC 8. I AM LOOKING INTO WHAT THEY RECOMMEND AS A STANDARD. LET'S HAVE YOUR IDEAS QUICK SO WE CAN AGREE ON SOME STANDARDS BEFORE EVERYBODY GOES THEIR OWN WAY.

THAT SEEMS TO COVER EVERYTHING TO DATE. HOPE YOU WILL BE PATIENT WITH THE TYPING AND THE DUPLICATING. IT IS A VERY TIME CONSUMING JOB AND WE DON'T HAVE THE BEST EQUIPMENT TO WORK WITH. I HOPE YOU FIND THE INFORMATION VALUABLE AND AGAIN, PLEASE SEND IN ANYTHING THAT MIGHT BE OF USE TO OTHERS. I CAN'T PUT OUT A NEWSLETTER WITHOUT YOUR HELP. THE THE NEXT ISSUE WILL BE ABOUT A MONTH AWAY. I HAVE TO GET BOTH MY 8008 PROJECTS RUNNING PLUS BUILD A PDP-8 SCOPE DRIVER INTERFACE.

IF ANYBODY NEEDS A CROSS ASSEMBLER TO ASSEMBLE CODE ON A PDP-8 LET ME KNOW.

HAL SINGER
MARK-8 NEWSLETTER EDITOR
CABRILLO COMPUTER CENTER
4350 CONSTELLATION
LOMPOC, CA 93436

BILL ALLMON, 3121 SOUTH K, OXNARD, CA 93030

BILL AMES, 304 MOSHER JORDEN, ANN ARBOR, MICH. 48104 IS A COMPUTER ENGR. STUDENT AT THE UNIV. OF MICHIGAN. HE IS INTERESTED IN A CASSETTE RECORDER INTERFACE, AND WANTS TO MODIFY THE MARK-8 TO USE 16K SO HE CAN WRITE A HIGH LEVEL COMPILER (BASIC, FORTRAN, OR PL/1 SUBSET). HE WOULD LIKE TO KNOW IF ONE CAN SIMPLY INCREASE THE CLOCK FREQUENCY AND SUBSTITUTE A 8008-1. HE PLANS TO DEVELOP A MORSE CODE SENDING AND RECEIVING PROGRAM (HE'S WAOWBJ), A HIGH PRECISION FLOATING POINT PACKAGE WITH FUNCTIONS, AND EVENTUALLY THE COMPILER. HE WANTS A SOURCE OF VERY CHEAP 1101'S AND DOESN'T MIND FALLOUTS SINCE HE IS GOING TO CHECK THEM WITH THE MARK-8. IN HIS SECOND LETTER, BILL INDICATES THAT 4K IS SMALL FOR A GOOD BASIC (IT TAKES 4K OF 12 BITS IN A PDP-8 SO 6K IN THE MARK-8 IS MORE REALISTIC) BUT HE IS THINKING OF PUTTING THE OP-CODE ONTO A CASSETTE, AFTER EDITING, ORDERING, ETC., POSSIBLE WITH A COMPILE COMMAND. HE WANTS TO KNOW IF IT IS POSSIBLE TO CONNECT A /41 OP AMP SO A POSITIVE SIGNAL WOULD PRODUCE A 1 AND A NEGATIVE ONE A 0 FOR USE IN AN ALPHA-WAVE BIOFEEDBACK ANALYSIS MONITOR, AND WHERE CAN HE GET ROM'S PROGRAMMED.

RON ANGSTADT, RDE 3 BOX 281, KITZTOWN, PA 19530 PLANS TO USE HIS MARK-8 FOR HOME SECURITY, TV GAMES, AND INVENTORY ON FOOD SUPPLIES.

BILL ARNOLD, 216 1/2 AVE. B, FORT DODGE, IOWA 50501 TEAMS COMMUNICATION SERVICE, SAYS HE CAN FORSEE GREAT USE OF THE MARK-8 WITH HIS BUSINESS OF DESIGN AND MAINTENANCE OF COMMUNICATIONS SYSTEMS AND ANTENNAS.

CRAIG A. BAKER, 1310 PEORIA, APT. 1, AURORA, CO 80011

OTTO BARTH, ELBA TOOL CO., INC., 601 ESTES AVE., SCHAUMBURG, IL 60172 HASN'T STARTED A MARK-8 YET AND WANTS TO KNOW WHERE TO GET RELIABLE COMPONENTS. HE IS A NOVICE IN COMPUTERS AND WANTS SOME SUGGESTIONS AS TO HOW TO GET STARTED. HE WOULD LIKE TO USE THE COMPUTER FOR SCORING AND TIMING SKI RACES.

HARRY B. BATEMAN, 5638 SOUTH FOX CIRCLE #102, LITTLETON, CO 80120

ANGEL BRAVO, 10333 FELSON ST., BELLFLOWER, CA 90706 WANTS TO USE THE MARK-8 TO GAIN EXPERIENCE IN DEVELOPING SOFTWARE.

RICK BRENNAN, 601 S. KNIGHT, PARK RIDGE, IL 60068

JAMES CALLAS, SAN RAFAEL, CA 94903 HOPES TO USE THE SYSTEM FOR INFORMATION STORAGE AND RETRIEVAL AND IS PARTICULARLY INTERESTED IN MODEMS AND TAPE STORAGE.

DAVE CHAPMAN, 3420 S. PERKINS RD., MEMPHIS, TN 38118 IS A DRAFTSMAN AND IS KEENLY INTERESTED IN COMPUTER AIDED DESIGN. HE WANTS TO PUT TOGETTHER A VERY LOW COST CAD WITH CASSETTE STORAGE, DIGITAL PLOTTER, AND A GRAPHICS DIGITIZER, AND WOULD LIKE TO COMMUNICATE WITH ANYONE WITH SIMILAR INTERESTS.

C. TOM CHILDRESS, JR., 1006 APPLE DRIVE., BICOXI, MS, 39532 WILL USE THE MARK-8 AS A DATA HANDLING MACHINE WITH A KEYBOARD, TVT, CASETTE TAPE, TELEHONE INTERFACE, D/A AND A/D CONVERTERS. HE PLANS TO USE 1K OF 1101 MEMORY AND THEN INCREASE SIZE IN 4K INCREMENTS USING 2102'S. HE HAS ORDERED THE MARTIN RESEARCH BOOK AND AN 8008.

STEPHEN CIARCIA, UNIVERSAL OIL PRODUCTS, 41 HILLTOP DR., WEST HARTFORD, CN 06107 IS AN A/D SYSTEM DESIGNER AND IS RESEARCHING THE 8080 FOR HIS COMPANY AND IS COLLECTING IDEAS FOR HIS OWN 8008 SYSTEM.

JOSEPH A. CIMMINO II, 19304 RICHWOOD COURT, BROOKEVILLE, MD 20729

SCOTT COLEMAN, 8515 SPRUCE ST., S.W., TACOMA, WASH 98498 (TILLICUM ELECT)

ROBERT W. COOK, 25W178 39TH ST., NAPERVILLE, IL 60540 HAS THE AD IN RE FOR THE 8008. HE IS TRYING TO COLLECT ENOUGH ORDERS TO PLACE A QUANTITY ORDER.

EDWARD DEGRAFF, 6611 WENZ AVE., APT. O, HODGKINS, IL 60527 PLANS TO BUILD THE MARK-8 AND CONNECT IT AS AN EXPANSION TO HIS HP-35. HE IS A CHEMICAL ENGINEER AND HAS APPLICATIONS INVOLVING HEAT AND MASS BALANCES AND WANTS TO BUILD THE MARK-8 INTO A SUITCASE SO IT CAN BE USED ON SITE.

LARRY, DENISE, 3375 AZTEC RD., APT. 32C, DORAVILLE, GEORGIA 30340

STEPHEN L. DIAMOND, 311 CARL ST., SAN FRANCISCO, CA 94117

CHARLES DITE, 82 DAVID ST., SOUTH RIVER, NJ 08882 SAYS THAT HE IS NEW TO THE COMPUTER FIELD AND CAN USE ALL THE HELP HE CAN GET. (LET PEOPLE KNOW WHAT YOU NEED CHARLES, YOU'LL GET LOTS OF HELP.)

BURTON DORF, 315 OVINGTON AVE., BROOKLYN, NY 11209 WANTS TO INTERFACE A CALCULATOR CHIP AND A CASSETTE RECORDER.

CHARLES ECHARD, 7820 JACKSON ROAD, BEAUMONT, TX 77706 WILL USE THE MARK-8 AS A GENERAL PURPOSE COMPUTER AND FOR DATA ACQUISITION.

PAUL N. EVEN, 4637 ROSEHILL ST., PHILADELPHIA, PA 19120 HAS AN ANTIQUE REMINGTON TYPEWRITER, AN HP #561B 11 DIGIT PRINTER, AND A PAPER TAPE PUNCH HE WILL BE INTERFACING AND IS INTERESTED IN BUILDING A PAPER TAPE READER, OSCILLOSCOPE DISPLAY AND CASSETTE RECORDER. HE IS WILLING TO TRADE PROGRAMS ON PAPER TAPE. HE SUGGESTS USING 14 PIN DIP SOCKETS AND WIRE WRAP DIP SOCKETS PIGGYBACK FOR I/O CONNECTIONS (VERY CHEAP), AND USING THE INPUT MUX CIRCUIT IN FIG. 2A, AND USING OUTPUT LATCHES TO DRIVE THEIR OWN DISPLAYS AS IN FIGURE 2B.

M. PAUL FARR, 3723 JACKSTADT, SAN PEDRO, CA 90731 IS ETCHING HIS OWN BOARDS, AND PROVIDED THE 2ND SOURCE 8008 DISTRIBUTOR.

F. DALLAS FOGG, 1385 HIGH STIE DR., APT. 101, ST. PAUL, MN 55121 WANTS TO USE THE TVT, CASSETTE MAG TAPE, A 256 WORD PROM. HE WANTS INTERRUPT ADDRESS POINTERS AND A TAPE LOAD ROUTINE IN PROM, AND WANTS TO DEVELOP A KEYBOARD DEBUGGING ROUTINE, AND A MORSE CODE DECODER WITH ITS DISPLAY ON THE TVT.,

JIM FRY, 4249 N. LOCKWOOD, TOLEDO, OH 43612 (DIGI-TEL ELECTRONICS) IS WORKING ON A PROGRAM TO HANDLE INTERRUPTS WITHOUT LOSING THE REGISTER OR FLAG INFORMATION AND A HARDWARE REPLACEMENT FOR THE TVT CURSOR BOARD WHICH WILL ALLOW THE COMPUTER TO INDIVIDUALLY ADDRESS ANY CHARACTER OR LINE IN THE DISPLAY AND READ OR WRITE INTO THAT LOCATION.

FRANK GEHERTY, 826 WILLOWGLEN ROAD, SANTA BARBARA, CA 93105

KEITH GOERING, 720 S. ASHBY, CHANUTE, KS 66720 MENTIONED THE C2 ERROR ON THE LED BOARD.
DON GOLENSKIE, BOX A-375, CAMARILLO, CA WANTS TAPES FOR FORTRAN, BASIC, AND PL/1 AND WANTS TO USE THE MARK-8 FOR NUMBER CRUNCHING.

DR. GEORGE L. HALLER, 1500 GALLEON DR., NAPLES, FL 33940 USES A SCELBI COMPUTER AND HAS ORDERED A 33 RO TTY. HE SAYS ACTON TECHNICAL SERVICES, 919 CRYSTAL SPRINGS AVE., PENSACOLA, FL 32505 HAS A SUPPLY OF THESE AT REASONABLE PRICES. HE ALSO SENT IN THE SORTING PROGRAM IN FIGURE 3.

O. F. HAMM, 4751 LOUISIANA AVE., ST. LOUIS, MO 63111 MENTIONED THE CA-LED BOARD ERROR AND POINTED OUT THE JUMPER OMISSION ON THE ADDRESS LATCH BOARD.

DAN HANCOCK, HANCOCKS' LABORATORY, PO BOX 312TALLAHASSEE, FL 32303 IS INTERESTED IN TEXT STREAMS, WORD PROCESSING, AND COMPUTER PRINTING OF ACADEMIC MATERIAL.

LLOYD G. HANSON, EE, CONSULTING ENGINEER, LAKELAND INSTRUMENT LABS, ROUTE 2, BOX 52-A, ANGOLA, IN 46703 WANTS TO GET TOGETHER WITH OTHER HAMS IN THE GROUP ON 15 OR 20 ONE DAY AND PASS AROUND INFORMATION (W9YCB). HE MENTIONS DODD DIGITAL DESIGN, 234 WAPLES PARK, FAIRFAX, VIRGINIA 22030 AS A DISTRIBUTOR OF TECHNICAL LITERATURE AND ASCII INTERFACE CARDS. THEIR CATALOG ON "SERIES 100" REQUIRES 50 CENTS IN STAMPS. SEE THE FOLLOWING: MOTOROLA DOCUMENT #AN-558, "CRT DISPLAY WITH DYNAMIC MOS RAM." ELECTRONIC DESIGN #19, EPT 14, 72. ELECTRONIC DESIGN #14, JULY 5, 74 PAGE 112, "IMPROVED DOT MATRIX GENERATOR". ELECTRONIC DESIGN, #1, JAN 4, 74, "7 X 9 CRT DISPLAY." PC BOARDS CAN BE OBTAINED FROM SEMTRONICS, RT 3, BOX 1, BELLAIRE, OH 43906. NOTE THE MARTIN RESEARCH INFO SUPPLIED BY LLOYD IN THE BACK OF THE NEWSLETTER.

RUDOLF HAUSDORF, 1961 REDONDO AVE., SALT LAKE CITY, UTAH 84108

IRVIN F. HAVENS, 9 HARVEY LANE, WESTBORO, MASS. 01581
DR. HOWARD, ELECTRICAL ENGR. DEPT., UNIV. OF CA, SANTA BARBARA, CA 93106. THEY ARE BUILDING 10 VERY ELABORATE 8008 BASED TRAINING SYSTEMS WITH OCTAL DIGIT INPUT AND OUTPUT, ALL REGISTER INFORMATION BROUGHT OUT DURING WAIT AND HALT, AND A VERY ELABORATE INTERRUPT STRUCTURE.

GREG HUNZINGER, 2332 OAKLAND ST., AURORA, CO 80010 WORKS FOR METRO STATE COLLEGE IN THEIR TV STUDIO AND IS BUILDING THE TVT TO INTERFACE WITH THEIR TV SYSTEM. HE WANTS TO ADD CASSETTE TAPE STORAGE SO HE CAN DO ALL KINDS OF WEIRD TITLING DURING TAPING OF A PROGRAM AND WOULD LIKE TO ATTEMPT SOME COMPUTER ART.

J. L. ISENHOWER, PO BOX 7352, LONG BEACH, CA 90807

PRIMUS E. JACKSON, JR., 947 18TH ST., SOUTH, ST. PETERSBURG, FL 33712

BYRON KIRKWOOD, PRESIDENT, KA ELECTRONIC SALES, 1220 MAJESTY, DALLAS, TX 75247 IS PROVIDING A SOURCE FOR SOME OF THE PARTS FOR THE MARK-8. HE MENTIONS THAT SOME OF THE PARTS ARE MORE EXPENSIVE THAN THE SURPLUS HOUSES, BUT ARE ALL NEW FIRST FIRST LINE DISTRIBUTOR PARTS. THEY DIS-TRIBUTE THE MF8008R MICROSYSTEMS INTERNATIONAL 8008 CHIP FOR $66. SEE THE COPY OF THE FLYER IN BACK OF NEWSLETTER.

JIM KASSEBAUM, RT 3 BOX 517, NEWBERG OR 97132 (TEKTRONIX) WAS THE FIRST ONE TO MENTION THE THRU BOARD JUMPER PROBLEM ON THE MEMORY BOARDS.

EDWARD KELLY, JR., PUBLIC ACCOUNTANT, 300 BARNSTABLE ROAD, HYANNIS, MA 02601

ROBERT W. KELLY, 5805 MT. TERMINAL DR., WACO, TX 76710 HAS ALSO ORDERED THE MARTIN RESEARCH BOOK AND 8008. HE PLANS TO USE THE MARK-8 FOR CALCULATION OF ENGINEERING PROBLEMS AND GENERAL RECORDS. HE AS OBTAIN-ED TWO TT-7/FG TTY'S (BAUDOT) AND WANTS INFORMATION ON INTERFACING THEM.

PAUL LENTZ, 7072 HANOVER PKWY., APT. D-1, GREENBELT, MD 20770

S. LIEBERMAN, [illegible] DURANGO AVE., LA, CA 90035 IS GOING TO DO A CALCULATOR AND CASSETTE TAPE INTERFACE. HE INCLUDED THE FOLLOWING ADDRESS FOR OBTAINING SWITCHES: UID ELECTRONICS, 4105 PEMBROKE RD., HOLLYWOOD, FL. 33021. HE IS ALSO INTERESTED IN 8080 SYSTEMS. HE BOUGHT THE MARTIN BOOK AND 8008 AND RECEIVED A CHIP WITH 2.5 MICROSEC CYCLE TIME VS INTEL'S 4.0 MICROSEC. HE IS IMPATIENTLY AWAITING HIS PC BOARDS AND RECOMMENDS LANCASTER'S TTL COOKBOOK (SAM). HE OFFERS THE FOLLOWING COMMENTS ON SUPPLIERS: BABYLON ELECTRONICS, VERY GOOD; POLYPAKS, VERY GOOD; DIGIKEY, VERY GOOD; INTERNATIONAL ELECTRONICS UNLIMITED, GOOD, 5% BAD UNITS, RETURN FOR REPLACEMENT. HE IS LOOKING FOR OTHER'S INTERESTED IN INTERFACING WITH AN HP-35.

MIKE LINDSEY, 2625 FAIRGREEN DRIVE, PITTSBURGH, PA 15241 IS AN EE STUDENT AT UNIV. OF PITTSBURGH AND IS DOING SOFTWARE DEVELOPMENT FOR THE MARK-8 BY USING A PDP-10 SIMULATION PROGRAM. HE WOULD LIKE TO SEE CASSETTE TAPE, CORE MEMORY, A FORTRAN IV, AND A TRUE X-Y VIDEO DISPLAY.

DANIEL C. LINGROTH, 35 OFFICER'S COURT, LEXINGTON PARK, MD 20653

LOOMIS LABORATORIES, ROUTE1, BOX 121, PRAIRIE POINT, MISS. 39353

J. MCCORD, 330 VEREDA LEYENDA, GOLETA, CA 93017

K. A. MCGINNIS, PO BOX 1287, SAN MATEO, CA 94401 WANTS TO KNOW IF ANYONE IS INTERESTED IN 8080'S. HE IS BUILDING A SMALLER VERSION OF THE MARK-8 AND WANTS TO INTERFACE A CASSETTE RECORDER. HE MENTIONED KA ELECTRONIC SALES AND ELECTRONIC COMPONENTS SALES AS POSSIBLE SUPPLIERS.

WILLIAM R. MAINS, 139 - 17TH ST., PASO ROBLES, CA 93446 IS WAITING TILL THE RIGHT TIME TO BUILD UP AN EDUCATIONAL SYSTEM FOR THEIR HIGH SCHOOL USING EITHER AN 8008 OR 8080 MICRO-PROCESSOR.

M&R ENTERPRISES, PO BOX 1011, SUNNYVALE, CA 94088 HAS A 2513, 2518, & 6 EACH OF 2524 KIT AVAILABLE FOR $42.50 & 8008 CPU'S FOR $75 AND IS ATTEMPTING TO PUT TOGETHER A COMPLETE KIT OF PARTS FOR THE TVT.

DAN MARTIN, BOX 653, MALTA, MONTANA 59538 IS A STUDENT IN HIGH SCHOOL AND IS BUILDING THE TVT AND MARK-8. HE HAS A CIRCUIT FOR 8 INPUTS AND 24 OUTPUTS THAT HE WILL SOON SEND IN.

A. F. MASHBURN JR., 2591 SHALLOWFORD ROAD N.E., APT. 18, ATLANTA, GA 30345

JOHN K. MICHALIK, 36 LATHROP ST., BUFFALO, NY 14212 IS BUILDING A 1K MARK-8 WITH THE TVT AND WANTS INFORMATION ON BUILDING A CASSETTE RECORDER.

W. S. MILLER, 2813 WAGNER DR., BURLINGTON, NC 27215 WANTS A MARK-8 WITH A TYPEWRITER AND CASSETTE TAPE INTERFACE.

R. W. MOELL, 5505 DAYWOOD CT., RALEIGH, NC 27609

DR. JOHN R. NICHOLS, CAPITOL CAMPUS 10, W154, PENNSYLVANIA STATE UNIVERSITY, MIDDLETOWN, PA 17057

TOM PAROUETTE, 116 SANFORD AVENUE, CLINTON, NY 13323 IS ORDERING PARTS AS HE CAN AFFORD THEM AND WANTS TO USE A CARD READER AND PUNCH, IMPACT PRINTER, CRT CONSOLE, EXPANDED MAIN MEMORY, AND TAPE AND DISK DRIVES.

CABELL A. PEARSE, 3523 TILDEN STREET, N.W., WASHINGTON D.C. 20008 INTENDS TO USE HIS MARK-8 AS AN INSTRUMENT CONTROL UNIT AND IS INTERESTED IN ANY UTILITY SOFTWARE ROUTINES AVAILABLE.

LAURENCE L. PLATE, 2320 SKYLINE WAY, SANTA BARBARA, CA 93109 LISTS AS ONE OF HIS PROJECTS THE WRITING OF A BASIC. HE IS NOW SORT OF RETIRED AND WAS THICK IN COMPUTERS IN MILITARY RESEARCH AND DEVELOPMENT. FOR REMOVING IC'S HE SUGGESTS USING KWIK-WICK (SIZE #2), A FINE IRON, AND A PRESSURE CLIP. HE WOULD RATHER USE IC SOCKETS. HE IS WILLING TO ANSWER QUESTIONS ON SOFTWARE PROBLEMS.

LARRY PLESKAC, 938 PAULA ST., ESCONDIDO, CA 92027 WOULD LIKE TO SEE A PAPER TAPE PUNCH AND READER, CASSETTE TAPE, A CALCULATOR INTERFACE, AND A GRAPHIC DISPLAY MODE FOR THE TVT. HE IS ADDING OCTAL READOUT DISPLAY, CPU STATE LAMPS, PROCESSOR CYCLE LAMPS, AND FLAG LAMPS TO HIS MARK-8

TED J. POULOS, 18 CUSHING ROAD, BROOKLINE, MASS. 02146 WILL USE HIS MARK-8 TO GAIN PRACTICAL EXPERIENCE IN PROGRAMMING IN ASSEMBLY LANGUAGE. HE HAS BUILT THE TVT AND WANTS TO ADD A CASSETTE RECORDER.

RADIO-ELECTRONICS, SUITE 1105, 200 PARK AVENUE SOUTH, NEW YORK, NY 10003

JOHN G. RAICHE, 10406 - 55TH AVE. SOUTH, SEATTLE WASHINGTON, 98178

DALE REID, 1127 DRAKE ST., MADISON, WISCONSIN 53715

RGS ELECTRONICS, 3650 CHARLES ST., SUITE K, SANTA CLARA, CA 95050 HAS ANNOUNCED THEIR 008A KIT. THEY ARE WORKING ON THE FOLLOWING ADDITIONS: KEYBOARD, ($50), CASSETTE RECORDER ADAPTER, TV ADAPTER. PRICE OF THE 008A IS $300 CASH. SEE ENCLOSED SHEET FOR DETAILS. THEY WOULD BE GLAD TO DEMONSTRATE IF YOU WOULD LIKE TO DROP IN. THEY ARE AGAIN STOCKING THE 8008 BUT AT $75. REGARDING RELIABLE SUPPLIERS, RAY STEVENS, THE OWNER, RECOMMENDS HIS OWN COMPANY OF COURSE, & BILL GODBOUT. HE KNOWS OF AT LEAST ONE PERSON THAT GOT BURNED BADLY BY ELECTRONIC COMPONENT SALES. THEY ALSO INCLUDE A 1 YEAR MEMBERSHIP IN THEIR PROGRAM EXCHANGE GROUP WITH THE KIT OR MANUAL ($25) PURCHASE.

R. RILEY, BOX 4310, FLINT, MI 48504

TERRY F. RITTER, VICE PRESIDENT, DIRECTIONAL ANTENNA CO., 2524B GLEN SPRINGS WAY, AUSTIN, TX 78741 FINISHED DEBUGGING HIS MARK-8 ON 9 SEPT. HE SUGGESTS USING OUTPUT PORT #5 AS INPUT TO A 74193 PROGRAMMABLE DELAY TIMER. (MORE DETAILS PLEASE). HE IS GOING TO CONNECT A TTY, COMPUTER KEYBOARD, AND CASSETTE TAPE I/O. HE PURCHASED HIS 8008 FROM BILL GODBOUT AND RECEIVED IT IN A WEEK, AIRMAIL, AND WITH A SOCKET. SUSPECTING IT TO BE DEFECTIVE, HE REQUESTED A REPLACEMENT AND IT ARRIVED IN FIVE DAYS, AGAIN BY AIRMAIL. HE COULDN'T BE HAPPIER WITH THEM AS A SUPPLIER. AN ORDER WITH SCELBI HAS BEEN IN FOR A MONTH AND A HALF WITH NO NOTICEABLE RESULTS. HE NOTES THAT IT IS POSSIBLE TO BUILD A BETTER INPUT BOARD BUT HAS NOT FURNISHED A SCHEMATIC AS YET. HE SUGGESTS USING SOFTWARE FOR ASCII TO BAUDOT CONVERSION. HIS LINE OF ATTACK IS: 1) KEYBOARD INTO COMPUTER (DONE) 2) KEYBOARD LOADING AND TTY DUMP SOFTWARE. 3) 1K ROM FOR BASIC SOFTWARE 4) CASSETTE TAPE DUMP 5) 12K CORE MEMORY SYSTEM. HE SPENT ABOUT 20 HOURS FULLY DEBUGGING HIS UNIT AND CAN SUGGEST LINES OF ATTACK IF ANYONE ELSE SHOULD HAVE PROBLEMS.

F. B. ROBERTSON, 1406 CREEK HOLLOW DRIVE, SEABROOK, TX 77586

NOLEN F. ROBERSON, 12511 JACKSON AVE., GRANDVIEW, NO 64030 IS A STUDENT AT PARK COLLEGE AND IS USING THIS PROJECT FOR HIS SENIOR LAB AND RESEARCH PROJECT. HE WANTS TO INTERFACE WITH A CALCULATOR CHIP.

WARREN G. ROME, 6221 AMHURST ST., METAIRE, LOUISIANA 70003 WILL INTERFACE THE TVT AND A CALCULATOR TO HIS MARK-8 AND USE IT FOR PERSONAL AND JOB RELATED PROBLEM SOLVING AND INFORMATION CONSOLIDATION.

SCELBI COMPUTER CONSULTING, INC., 1322 REAR - BOSTON POST ROAD, MILFORD, CN 06460 ORDER THEIR BASIC LITERATURE PACKAGE. THEY OFFER KITS STARTING WITH BARE BOARDS AND GOING ALL THE WAY TO AN ASSEMBLED 4K COMPUTER. THEY ALSO FEATURE SOFTWARE AND A CRT AND CASSETTE RECORDER INTERFACE. A COPY OF THEIR INFO SHEET FOR THE CASSETTE RECORDER IS INCLUDED. THEIR MANUAL PRICE IS NOW $10. THEIR EXPERIENCE WITH HOBBYIST OUTLET 1101'S WAS A FAILURE RATE OF 15 TO 40%. ABOUT 80% OF THE FAILURES WERE FOUND IN INCOMING INSPECTION AFTER TEMPERATURE CYCLING. THE REMAINDER FAILED LATER, USUALLY WITHIN SEVERAL WEEKS BUT SOME AFTER SEVERAL MONTHS. THEY SUGGEST THAT IF YOU ARE GOING TO USE CHEAP MEMORY COMPONENTS THAT YOU HAD BETTER BE READY FOR LOTS OF FRUSTRATIONS. THEY CAN SUPPLY A LIMITED NUMBER OF INTEL 1101'S IN GROUPS OF 8 CHIPS FOR $45. THEY ALSO CAUTION THAT IF YOU ARE USING CHEAP IC'S FROM HOBBY SUPPLIERS, CHECK THEM BEFORE YOU SOLDER THEM INTO THE BOARD. TO REMOVE IC'S FROM A BOARD, THEY SUGGEST SACRIFICING THE IC BY CLIPPING THE LEADS ON THE TOP OF THE BOARD AND THEN SUCKING OUT THE SOLDER AND REMAINING LEADS FROM THE HOLES.

GRANT RUNYON, 1146 NIRVANA ROAD, SANTA BARBARA, CA 93101 IS BUILDING A TVT FOR USE IN THE HIGH SCHOOL FOR OFF-LINE PREPARATION OF PROGRAMS TO BE INPUT TO THEIR DATA GENERAL TIME-SHARE BASIC SYSTEM.

WILLIAM E. SEVERANCE, JR., CENTER LOVELL, MN 04016 IS CURRENTLY BUILDING THE TVT AND EXPECTS TO START THE MARK-8 IN DECEMBER. HIS PRESENT PLANS INCLUDE EXPERIMENTING, SOFTWARE DEVELOPMENT, (HE SPECIALIZED IN PDP-10 ASSEMBLY LANGUAGE PROGRAMMING IN COLLEGE), AND DESIGN OF ADD-ONS SUCH AS A CALCULATOR INTERFACE, FSK MODEM FOR AUDIO CASSETTE STORAGE, AND A PROM PROGRAMMER. HE MENTIONS THAT IT IS VERY IMPORTANT THAT WE JOIN TOGETHER IN STANDARDIZATION OF I/O AND SOFTWARE FORMAT FOR FULL INTERCHANGE OF INFORMATION.

WM J. SCHENKER MD, 1515 NEWELL AVENUE, WALNUT CREEK, CA 94596

RONALD E. SEIBEL, 10 B ADAMS ST., AVON PARK, FL 33825

DON SINGER, ROUTE 1, BOX 12318, GASTON, OR 97119

ROGER L. SMITH, SMITH ENTERPRISES, 4502 E. NANCY LANE, PHOENIX, AZ 85040 ANNOUNCED THAT HE HAS AN ADD-ON CIRCUIT BOARD TO BE ADDED TO THE TV TYPEWRITER TO ENABLE ONE TO TRANSMIT AND RECEIVE DATA AS WELL AS RECORD IT ON A CASSETTE TAPE RECORDER. THE RECORDING FEATURE WOULD BE HANDY IN CONJUNCTION WITH A MARK-8 AS A BULK STORAGE MEDIUM. IT IS SCHEDULED FOR THE DECEMBER RE.

LEE L. C. SORENSEN, 10226 VICTORIA AVE., WHITTIER, CA 90604 FOUND THE SCELBI-8H USER MANUAL VERY VALUABLE ($10 FROM SCELBI). HE ALSO MENTIONS THE FIRST OF A TWO PART BOOK ARTICLE IN ANALYTICAL CHEMISTRY, VOL 46, #11, PAGE 917A SEPT. 74.

WAYNE SPLAWN, 1680 SE 2ND PLACE, GRESHAM, OR 97030

PETER SPOERRI, BOX 1527, HUNTER COLLEGE, 695 PARK AVENUE, NY, NY 10021 IS PRESENTLY INVOLVED IN BUILDING A MARK-8 FOR USE IN A CHEMICAL INSTRUMENTATION CLASS. HE IS GOING TO INTERFACE A SILICONIX LD110-11 A/D CONVERTER. HE SPOTTED A CASSETTE RECORDER TO TTY INTERFACE IN A RECENT ISSUE OF ELECTRONICS

MARK STUMM, 927 LAFAYETTE AVE., CINCINNATI, OHIO 45220

MICHAEL STEVENS, 10200 DESOTO AVE., CHATSWORTH, CA 91311

D. W. STICKLEY, BOX 370, MARS, PA 16046

BOB STOLLER, DIGITAL EQUIPMENT CORPORATION, PDP-11 SMALL SYSTEMS, MAYNARD, MASS. 01754

E. KENNETH TAYLOR, COMMUNICATIONS CONSULTANT, W6WT , 8528 WEST HARGIS ST., LOS ANGELES, CA 90034 IS STILL HAVING TROUBLE FINDING TVI PARTS AND IS STARING TO ACQUIRE MARK-8 PARTS.

JONATHAN A. TITUS, TITUS LABS, P.O. BOX 242, BLACKSBURG, VA 24060 HAS A CALCULATOR INTERFACE SCHEDULED FOR RE IN THE NEXT COUPLE OF MONTHS AND IS WILLING TO CONTRIBUTE SOME ITEMS SUCH AS A REMOTE INTERRUPT MODULE, EXPANSION OF MEMORY USING 2102 RAMS AND AN ASYNCHRONOUS TTY INTERFACE. HE IS PARTICULARLY HAPPY SO MANY PEOPLE HAVE ACTUALLY UNDERTAKEN CONSTRUCTION OF THE MARK-8. HE HAS A VERY INTERESTING MICRO-PROCESSOR ARTICLE IN EDN, AUG 20, 74, "HOW TO DESIGN A MICRO-PROCESSOR BASED CONTROLLER SYSTEM."

JAMES UPCHURCH, BOX 1987, SEBRING, FL 33870 WANTS A GOOD SOURCE OF MOLEX CONNECTORS.

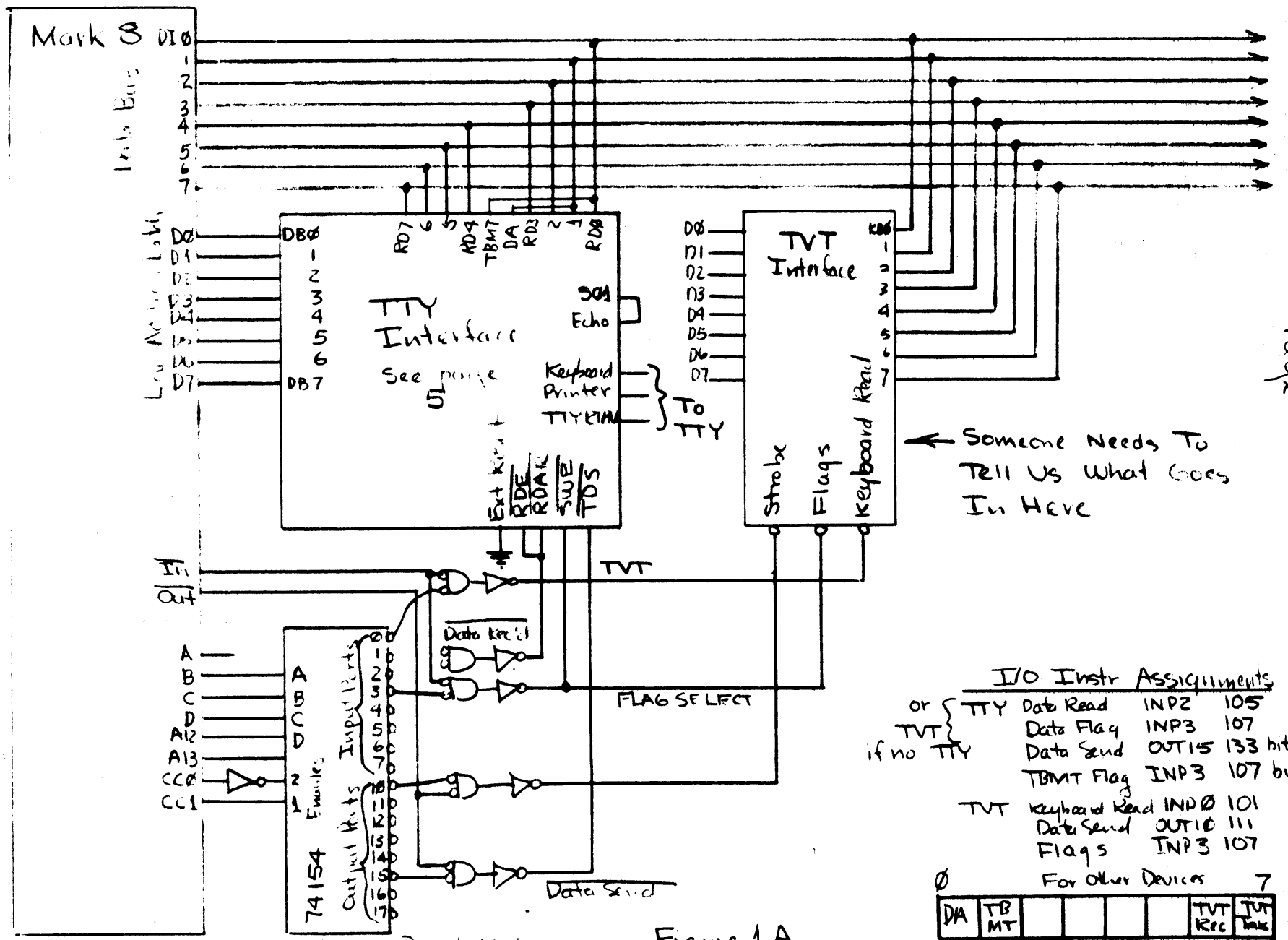
CPT. MACK C. WARD JR., 3215 BARKSDALE RD., FAYETTEVILLE, NC 28301 HAS COMPLETED SOME RESEARCH ON BCD ALGORITHMS THAT HE WILL PROVIDE TO THE GROUP. HE INTENDS TO USE THE MARK-8 FOR TINKERING FOR THE MOST PART. HE IS NOW DEVELOPING A SOFWARE ROUTINE FOR HANDLING HIS END OF THE MONTH BILLS AND IS WORKING ON A LEAST SQUARES REGRESSION ANALYSIS PROGRAM.

KIRK WARREN, 5025 THACHER ROAD, OJAI, CA 93023

P. S. WEISS, 1020 WASHINGTON BLVD., OAK PARK, IL 60302

DARRELL D. WOOD, 1404 S. 57TH ST., MILWAUKEE, WISC. 53214 IS PLANNING ON SENDING US SOME DIAGRAMS AND PLANS FROM OTHER BOOKS THAT DEAL WITH X-Y PLOTTERS AND STRIP RECORDERS. HE IS WORKING ON A CHEAP X-Y PLOTTER.

MAX L. WYMORE, EDWARDS, SPANGLER, WYMORE & KLASS, ATTORNEYS AND COUNSELORS, 1200 UNITED BANK CENTER, 1700 BROADWAY, DENVER, CO 80202



Page 18

I/O Instr Assignments

or TTY / TVT if no TTY	TTY	Data Read	INP2	105
		Data Flag	INP3	107
		Data Send	OUT15	133 bit Ø
		TBMT Flag	INP3	107 bit 1
	TVT	Keyboard Read	INPØ	101
		Data Send	OUT1Ø	111
		Flags	INP3	107

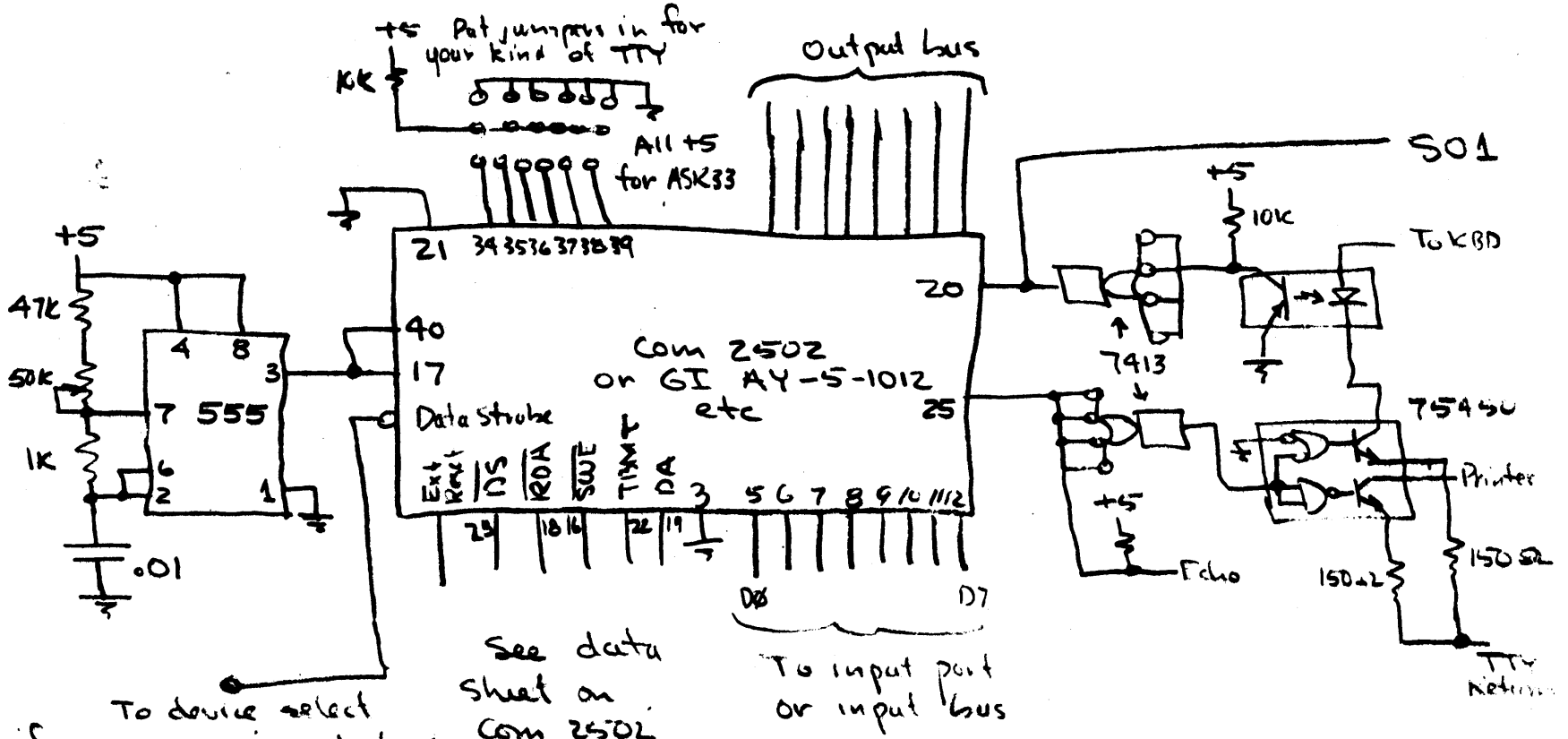
Ø — For Other Devices — 7

DA	TB MT					TVT Rec	TVT Trans

Flag Assignments

(Note: Previous Mark-8 Output Ports Remain Tri State As Is)

Figure 1A Expanded I/O Configuration



Order COM 2502 from

Energy Electronic Products Corp
6060 Manchester Ave
LA, CA 90045 for $13.20

Or Celetron Electronics
1618 James St
Syracuse, NY 13203 for $9.95
(he will supply a detailed TTY schematic)

Figure 1B TTY Interface
(See also Fig 1A)

Figure 2A Paul Even's Input Multiplexer Circuit "1" = GND "0" = +5V

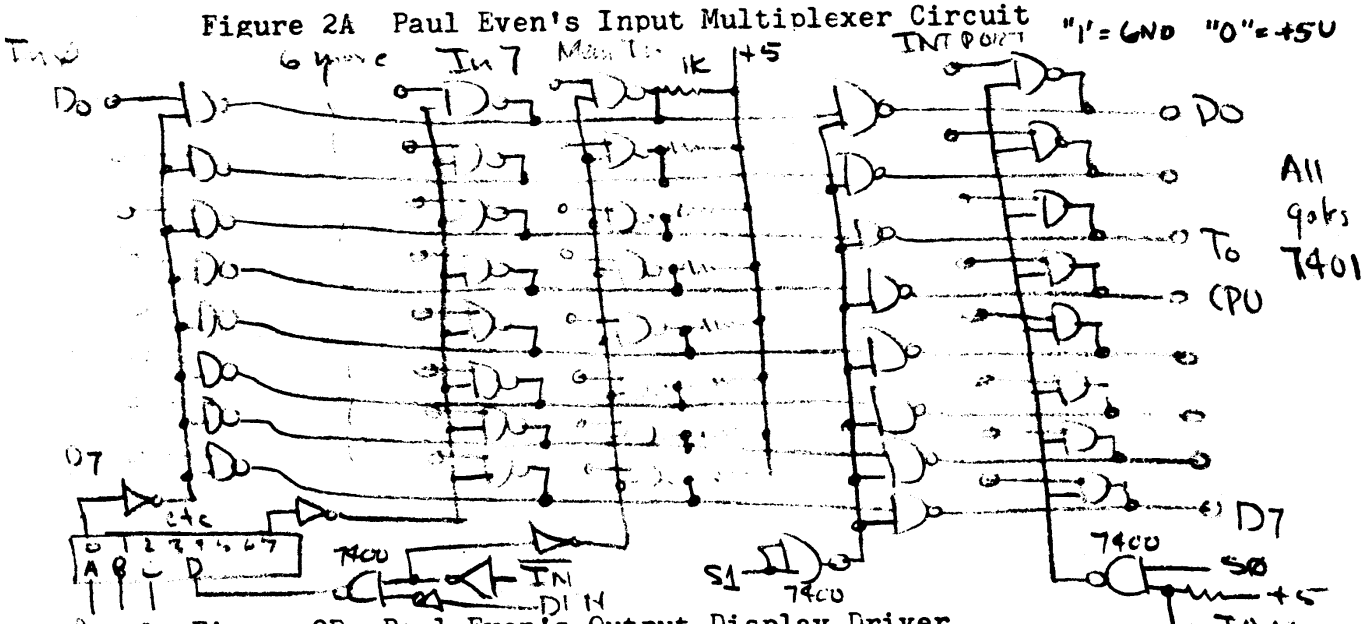


Figure 2B Paul Even's Output Display Driver

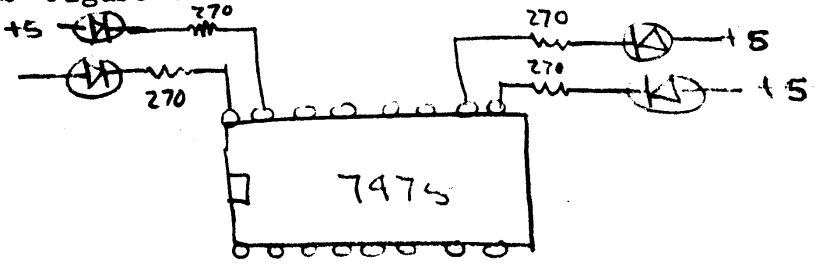


Figure 3 Dr. George Haller's Sorting Program

```
000 000   056     LHI
    001   001
    002   066     LLI
    003   000
    004   026     LCI
    005   XXX     One less than number of numbers
    006   307     LAM
    007   240     NDA sets C Flag
    010   060     INL
    011   277     CPM
    012   140     JTC
    013   030
    014   000
    015   021     DCC
    016   110     JFZ
    017   006
    020   000
    021   377     hlt
    030   317     LBM
    031   061     DCL
    032   307     LAM
    033   371     LBM
    034   060     INL
    035   370     LMA
    036   104     JMP
    037   000
    040   000
```

DELIVERY--Microcomputer Design is scheduled for publication on October 15, 1974. Prepublication orders will be shipped postpaid on that date, by United Parcel Service (by mail in non-UPS areas). Orders received after October 15 will normally be shipped within five days of receipt.

8008 OFFER--As advertised, one 8008 microprocessor is included with the book at a special promotional price, which is competitive with the price usually paid for the 8008 alone. The MF8008R supplied is manufactured by Microsystems International, Ottawa, Canada, and is identical to the Intel part. *(See second-source announcement in the* Electronic Design *survey of microprocessors, September 1, 1974, page 64.)* Each chip is tested and guaranteed. An 8008 manual will be shipped to purchasers with the book.

EARLY 8008 SHIPMENT--A person who orders *Microcomputer Design* before the publication date, October 15, 1974, and who wishes to receive the 8008 in advance, can make arrangements for early shipment of the microprocessor. Advance payment for the book, at $100.00, will be required.

CONTENTS OF THE BOOK--See the *CHAPTER OUTLINE*. The book is an original work, going far beyond the materials available from the microprocessor manufacturers. Release of the book, or sections thereof, before the publication date is not possible. *Microcomputer Design* is a copyright publication protected under the laws of the United States.

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Chapter Outline

1.	INTRODUCTION	*What a microcomputer is and how it is used. Why microprocessor applications are growing. Cost of microprocessors as compared to random logic designs. Focus of this book: practical microcomputer design, with examples and schematics.*
2.	THE 8008 CPU	*General description. Speed and processing power of instruction set. Block diagrams. Timing.*
3.	THE 8080 CPU	*Description. Speed, added capabilities of instruction set. Comparison with 8008 for cost-effectiveness.*
4.	OTHER CPUs	*General descriptions of other currently available microprocessors.*
5.	8008 MAIN TIMING LOGIC	*Block diagram of full microcomputer. CPU clock design.* State decoding techniques.* Cutting manufacturer's prototype CPU chip count 20-50%.**
6.	BUS STRUCTURES	*Bidirectional bus drivers: advantages for systems design.**
7.	MICROCOMPUTER INPUT/ OUTPUT TECHNIQUES	*Input multiplexer design.* Bus-structured input design.* I/O strobe lines.* Peripheral strobe decoding techniques.**
8.	INPUT DESIGN APPROACHES	*Three-state devices.* Inputs from FIFOs; using FIFOs to absorb data bursts; interfacing to microprocessor.* UARTS.* Conditional input concepts.* Expanding number of input ports.**
9.	OUTPUT DESIGN APPROACHES	*Pulse outputs.* Gates and decoders.* One-shot outputs.* Conditional pulse outputs.* Standard conditional and addressable latch outputs.* Driving LED lamps from latches.* Flip-flop output design.* Multiple flip-flop outputs.* Alternate-action flip-flops.* Use of flip-flop for last-executed-port steering memory.**
10.	COMBINED INPUT/ OUTPUT TECHNIQUES	*When an input is an output. Table lookups.* Byte-swapping techniques.**
11.	ADDING INSTRUCTIONS TO 8008	*Simple hardware to provide one-byte 8008 instructions: output any register with one byte.* One-byte WAIT instruction.* SIN, COS, SQUARE ROOT instructions.**
12.	EXPANDING 8008 CAPABILITIES	*Push-pop, or LIFO, registers: implications for handling interrupts.* A one-byte, one-chip LIFO.* Low-cost 32-byte LIFO register.* Saving flags with software; examples. Single-chip design for flag saving.* Simple six-bit flag-saving technique.* Four-bit version.**
13.	RANDOM ACCESS MEMORY	*Design and cost criteria. Static RAMs.* Dynamic RAM.**
14.	READ-ONLY MEMORY (ROM)	*Comparison of types; suitability in different applications. Field-programmable ROMs for system characterization.* ROM programmers.**
15.	DIRECT MEMORY ACCESS	*Floating memory address lines.* Keeping track of external addresses. Avoiding interference with normal program flow.*

(continued, over)

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* *SCHEMATIC DIAGRAMS INCLUDED.*

microcomputer design

16.	HANDLING INTERRUPTS	*"Zero-level" system.* Single-level system.* Three-level system with software priority encoder.* Full eight-level priority interrupt.**
17.	SAVING STATUS DURING INTERRUPTS	*Software approach using 8008, and its limits; examples. 8080 software. Hardware approach using 8008; costs.* Saving needed registers, flags with one chip.* Other designs.**
18.	INTERVAL TIMERS	*Timers to be read into CPU.* Timers to cause interrupts.**
19.	DIGITAL DISPLAYS	*Low-power seven-segment displays.* Scanning displays with decoders and multiplexers.**
20.	PERIPHERAL INTERFACE DESIGN	*Interfacing the peripheral to the microcomputer: where to draw the line. Systems approach to tapes, discs, keyboards, paper tape, modems.*
21.	KEYBOARDS	*Scanning keyboard encoders.* 2-of-13 encoders.* Interfacing to FIFO buffers and to microprocessor.**
22.	ANALOG INPUTS AND OUTPUTS	*Analog sample/hold.* Track/hold.* Analog multiplexer.* A/D converter.* Successive approximation registers.* D/A converters.* Analog output range switching to increase resolution.* Use of sample/hold, multiplexers for low-cost analog outputs.* Software implementation.*
23.	SOFTWARE TRICKS	*General purpose programs. Push-pop stack routine for 8008. Table lookup. Jump table. Indexed loops.*
24.	TESTING	*Designing microcomputers for easy testing. Externally sync'd scope.* Programs useful in repair work.* Using interrupts for testing.* Inexpensive three-chip 16-channel display for development and testing.* Octal or hex display to read instructions on the fly at normal system speed.**
25.	A 15-IC 8008 MICROCOMPUTER	*How it works.* Interrupt handling: saving status, losing use of only one register.*
26.	A 19-IC 8008 MICROCOMPUTER	*With interrupts, 2K bytes ROM, 256 bytes RAM. Input and output interfaces and full keyboard interface.*

APPENDICES

A.	GLOSSARY OF SYMBOLS	*Logic symbols used in this book.*
B.	MOS ICs	*Capacitative loading and speeds for MOS ICs used in this book.*

* *SCHEMATIC DIAGRAMS INCLUDED.*

THIS IS AN INTERFACE THAT ALLOWS THE USER TO UTILIZE A LOW COST AUDIO TAPE CASSETTE RECORDER AS A PERIPHERAL DEVICE FOR STORING PROGRAMS OR DATA FOR THE SCELBI-8H MINI-COMPUTER. THE DATA OR PROGRAMS CAN THEN BE RELOADED BACK INTO THE MEMORY OF A SCELBI-8H WHENEVER DESIRED. THE SYSTEM IS ABOUT FIVE TIMES FASTER THAN A TYPICAL TELETYPE PAPER TAPE SYSTEM. IT THUS GREATLY INCREASES THE EFFICIENCY WITH WHICH PROGRAMS CAN BE LOADED INTO THE COMPUTER, OR SAVED FOR FUTURE USE. THE LOW COST OF THE UNIT MAKES IT AN EXTREMELY ATTRACTIVE ADDITION TO ANY SCELBI-8H MINI-COMPUTER SYSTEM.

TECHNICAL INFORMATION

THE SCELBI AUDIO MAGNETIC TAPE INTERFACE UTILIZES AN ASYNCHRONOUS RECORDING TECHNIQUE THAT GREATLY SIMPLIFIES THE RECORDING AND PLAYBACK PROCESS WHILE SIGNIFICANTLY INCREASING THE RELIABILITY OF THE SYSTEM.

IN THE RECORDING MODE THE INTERFACE ACCEPTS 4 BITS (HALF OF A SCELBI-8H WORD) IN PARALLEL FROM AN OUTPUT PORT AS DATA BITS FOR TRANSMISSION TO THE TAPE RECORDER. TWO ADDITIONAL BITS ON THE SAME OUTPUT PORT (OF THE REMAINING 4 AVAILABLE) ARE USED TO CONTROL OPERATION OF THE INTERFACE/TAPE RECORDER. ONE OF THESE TWO BITS IS USED TO ACTUATE A SMALL RELAY ON THE INTERFACE CARD. THE CONTACTS OF THE RELAY MAY BE USED TO AUTOMATICALLY START OR STOP THE TAPE RECORDER. THE SECOND BIT INFORMS THE INTERFACE WHEN IT IS TO GO TO THE WRITE MODE.

WHEN THE INTERFACE RECEIVES THE 4 DATA BITS TO BE WRITTEN ON THE TAPE RECORDER, THE INTERFACE ADDS A "START" BIT TO THE DATA AND THUS TRANSMITS A GROUP OF 5 BITS OF INFORMATION (START BIT PLUS 4 DATA BITS) TO THE TAPE RECORDER USING A TWO TONE FSK TECHNIQUE AT A NOMINAL RATE OF 650 BAUD. THE FSK TONES ARE NOMINALLY 1300 HZ FOR A "0" AND 2600 HZ FOR A "1" CONDITION. DURING THE TIME THAT THE DATA IS BEING SERIALLY TRANSMITTED TO THE TAPE UNIT, A CONTROL SIGNAL GOING TO AN INPUT PORT OF THE SCELBI-8H COMPUTER IS USED TO INFORM THE COMPUTER THAT THE INTERFACE IS "BUSY." WHEN THE DATA HAS BEEN TRANSMITTED THE BUSY FLAG IS CLEARED AND THE INTERFACE IS READY TO ACCEPT THE NEXT 4 BITS FROM THE COMPUTER.

THE INTERFACE ALSO CONTAINS A DELAY CIRCUIT THAT ENABLES THE TAPE RECORDER UNIT TO REACH NORMAL OPERATING SPEED BEFORE THE FIRST GROUP OF BITS IN A BLOCK OF DATA ARE TRANSMITTED.

IN THE RECEIVE MODE THE INTERFACE ACCEPTS DATA IN ASYNCHRONOUS SERIAL FASHION. DATA COMING FROM THE TAPE RECORDER IS FED TO A FSK DISCRIMINATOR. THE OUTPUT OF THE DISCRIMINATOR IS FILTERED, SHAPED, AND LEVEL SHIFTED TO PROVIDE A "TTL" SIGNAL TO ONE LINE OF AN INPUT PORT ON A SCELBI-8H. THIS LINE IS NORMALLY ON THE SAME INPUT PORT AS THAT USED TO RECEIVE THE "BUSY" FLAG. IN THE RECEIVE MODE A TYPICAL TAPE READ PROGRAM CHECKS THE INPUT DATA LINE UNTIL IT DETECTS A START BIT. AFTER THE START BIT HAS BEEN DETECTED APPROPPIATE DELAYS ARE USED TO ALLOW PROPER SAMPLING OF THE NEXT 4 DATA BITS. THE 4 DATA BITS ARE ORGANIZED INTO HALF A SCELBI-8H WORD AND THE PROCESS REPEATED UNTIL A BLOCK OR FILE OF DATA HAS BEEN RECEIVED AND PLACED IN MEMORY. STANDARD SCELBI PROGRAMS USE A "CHECK-SUM" TECHNIQUE TO VERIFY THE RECEPTION OF CORRECT DATA. THE USE OF THE VERY SHORT LENGTH BIT GROUPS IN AN ASYNCHRONOUS FASHION COMPENSATES FOR SIGNIFICANT VARIATIONS IN TAPE SPEED WHICH IS OFTEN A PROBLEM WITH LOW COST TAPE RECORDERS AND MAKES

THE SCELBI AUDIO MAGNETIC TAPE SYSTEM A REMARKABLY RELIABLE AND YET LOW COST METHOD FOR STORING AND RETRIEVING PROGRAMS OR DATA.

THE INTERFACE CIRCUITRY IS CONTAINED ON TWO PRINTED CIRCUIT CARDS MEASURING 4 1/2 BY 6 1/2 INCHES THAT PLUG INTO 22 PIN P.C. SOCKETS. THE UNIT IS PACKAGED IN AN ALUMINUM MINI-BOX WITH TWO 11 PIN MALE I/O CONNECTORS AND APPROPRIATE CONNECTORS FOR POWER. POWER REQUIREMENTS ARE APPROXIMATELY 250 MA. AT +5 VOLTS. THE POWER SHOULD BE DERIVED FROM THE SAME SOURCE AS THAT USED BY THE SCELBI-8H MINI-COMPUTER.

THE INTERFACE REQUIRES ONE SPECIAL "SYNC" SIGNAL FROM THE SCELBI-8H MINI-COMPUTER. THIS SIGNAL IS NORMALLY ROUTED FROM THE COMPUTER THROUGH A SPARE PIN ON THE INPUT PORT I/O CONNECTOR THAT IS USED WITH THE INTERFACE.

TYPES OF RECORDERS TO USE WITH THE INTERFACE

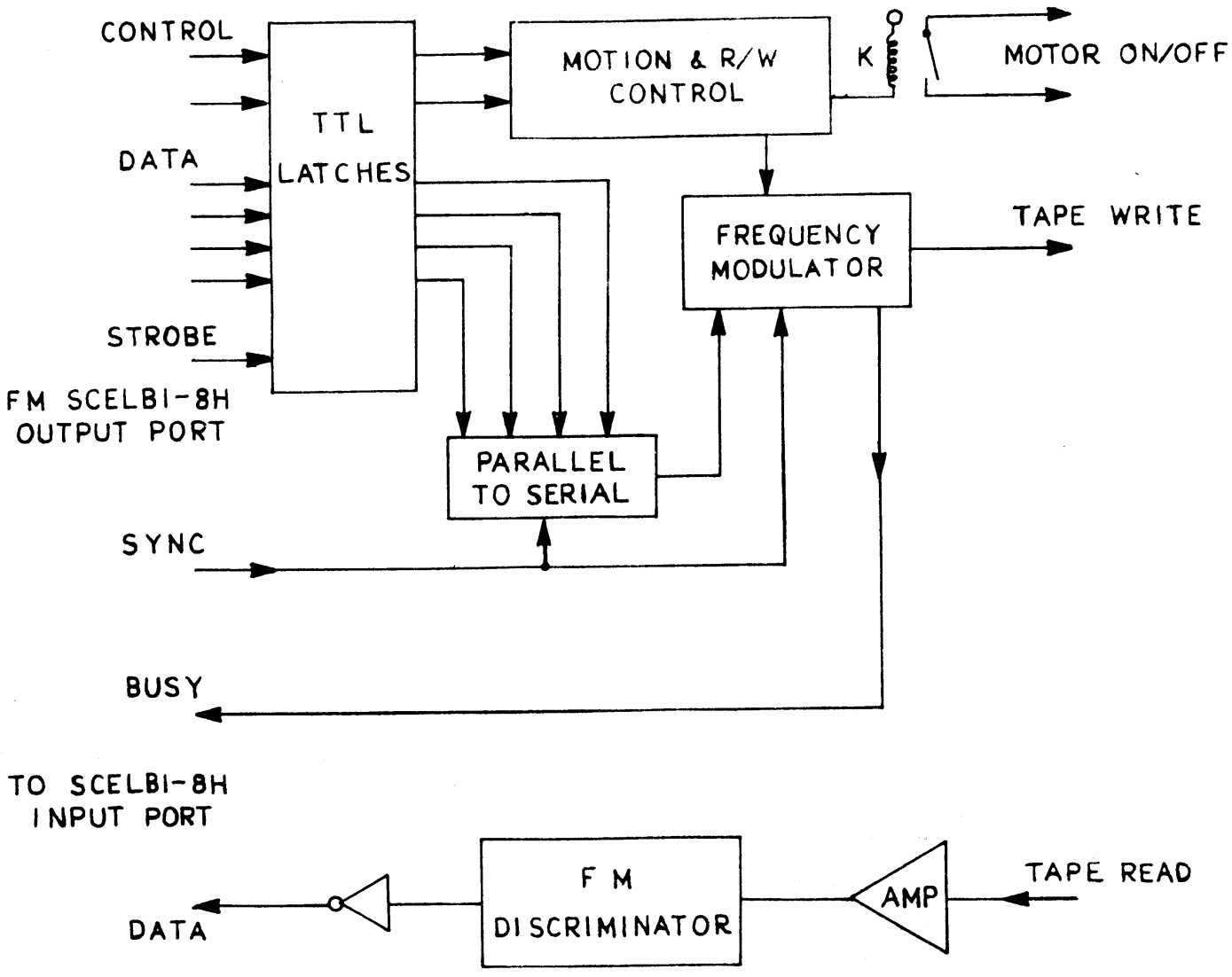
THE SCELBI AUDIO MAGNETIC TAPE INTERFACE HAS BEEN DESIGNED TO OPERATE WITH LOW TO MEDIUM COST CASSETTE TAPE RECORDERS THAT HAVE THE FOLLOWING MINIMUM SPECIFICATIONS: CAPSTAN SPEED CONTROL WITH MAXIMUM VARIATION OF PLUS OR MINUS 5%, FREQUENCY RESPONSE PLUS OR MINUS 3 DB OVER THE RANGE OF 300 TO 6000 HERTZ, AN AUXILLIARY INPUT FOR RECORDING AND AN EARPHONE JACK FOR PLAYBACK. AS AN OPTION, RECORDERS THAT ALLOW A BUTTON ON A MICROPHONE TO BE USED TO START AND STOP TAPE MOTION, AND THAT HAVE A SUBMINIATURE JACK PROVIDED FOR THIS FUNCTION, CAN BE USED WITH THE RELAY PROVIDED ON THE SCELBI INTERFACE TO PLACE THIS FUNCTION UNDER CONTROL OF THE COMPUTER. IN ADDITION, RECORDERS WITH A MANUAL "RECORD VOLUME" CONTROL ARE PREFERRED OVER THOSE WITH AUTOMATIC RECORD GAIN CONTROL AND RECORDERS WITH CONTINUOUSLY ADJUSTABLE TONE CONTROL(S) ARE PREFERRED OVER THOSE THAT HAVE NO TONE CONTROL, OR THAT HAVE SWITCH SELECTED TONE RANGES. THESE TONE AND GAIN CONTROLS CAN OFTEN BE USED TO "PEAK" A RECORDING UNIT SO THAT THE BIT ERROR RATE IS AT A MINIMUM.

IN ADDITION, A GOOD QUALITY CASSETTE TAPE SHOULD BE USED WHENEVER THE RECORDER IS USED FOR STORING DATA OR PROGRAMS.

IT SHOULD BE NOTED THAT THE SCELBI-8H AUDIO MAGNETIC TAPE INTERFACE DOES NOT REQUIRE ANY MODIFICATIONS TO THE TAPE RECORDING UNIT - WHEN THE RECORDER IS NOT BEING USED WITH THE SCELBI-8H MINI-COMPUTER IT CAN BE USED AS A GENERAL PURPOSE TAPE UNIT.

SINCE THE QUALITY OF THE CASSETTE TAPE AS WELL AS THAT OF THE TAPE RECORDER WILL HAVE AN OVER-ALL EFFECT ON THE RELIABILITY OF THE TAPE SYSTEM, IT IS VIRTUALLY IMPOSSIBLE TO SPECIFY A BIT ERROR RATE FOR SUCH A SYSTEM. HOWEVER, EXTENSIVE TESTING AND USAGE OF A VARIETY OF TAPE RECORDERS COMMONLY AVAILABLE IN THE $50.00 TO $75.00 RANGE HAS SHOWN THE SYSTEM TO BE REMARKABLY RELIABLE FOR THE COST AND QUITE ADEQUATE FOR THE PURPOSES FOR WHICH IT WAS DESIGNED. BIT ERROR RATES ARE TYPICALLY IN THE RANGE OF 1 IN 100,000 TO 1 IN 1,000,000. THE USE OF "CHECK-SUM" TECHNIQUES ALLOWS THE OPERATOR TO VERIFY THE CORRECT READING OF BLOCKS OF DATA. THE ADDITION OF SOFTWARE ERROR CORRECTING TECHNIQUES CAN FURTHER INCREASE THE OVER-ALL RELIABILITY OF THE SYSTEM IN SPECIAL APPLICATIONS.

A BLOCK DIAGRAM OF THE SCELBI AUDIO MAGNETIC TAPE INTERFACE IS INCLUDED FOR REFERENCE.



BLOCK DIAGRAM

SCELBI AUDIO TAPE INTERFACE

Home tape recorder stores binary data

With just two simple circuits—one a voltage differentiator, the other a Schmitt trigger—you can use an ordinary tape recorder to record or play back binary data.

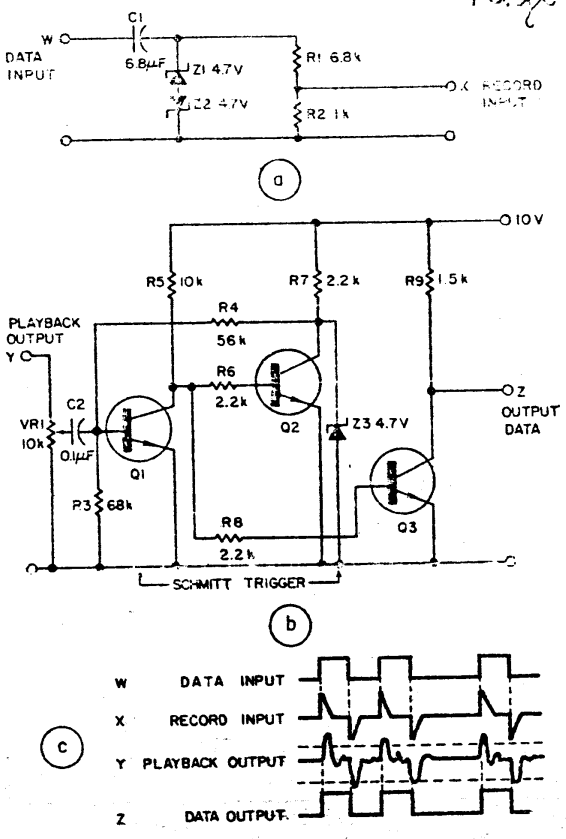
In the diagram the differentiator removes the low frequency and dc components of the binary data to be recorded and transforms the data to a series of positive and negative pulses. The values of R1, R2 and C1 were chosen to match the input impedance of the recorder and to minimize data-source loading. The time constant of the differentiator, (R1 + R2)C1, is about one-fourth of the bit time.

Zener diodes Z1 and Z2 force the amplitude of the recorded information to be essentially constant.

The Schmitt trigger, containing Q1 and Q2, differentiates between data pulses and any ringing in the waveform. Potentiometer VR1 is adjusted for the particular tape recorder to detect only the peaks and valleys in the playback waveform corresponding to bit edges. Transistor Q3 and associated components serve as a buffer between the Schmitt trigger and the output. The opposite polarity signal may be obtained at the output simply by connecting R8 to the collector of Q2 instead of Q1.

L. E. Davies, Terminal Systems Dept., International Computers Ltd., Kidsgrove, Stoke-on-Trent, ST7 1TL, England.

VOTE FOR 312



A voltage differentiator and Schmitt trigger are the main components needed to convert a home tape recorder into a binary data machine. The voltage differentiator circuit (a) converts the data to a form suitable for recording; the second circuit (b) reconverts the recorder output to its original form. Waveforms are shown in c.

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Dear Inquirer:

I placed an ad in Radio Electronics offering an Intel 8008 for $80 because I have an opportunity to obtain 8008's at a quantity price if I can obtain a few more people who are interested. If you are interested in placing an order for one through me, you may do so in one of the following ways. First you may send me $80 and as soon as I have the chips I will send yours to you postpaid and insured. Second you may send me an order and request that it be sent to you COD, in which case the price will be $88 in addition to which you will have to pay the COD fee when it arrives, which I understand is about $1. I would much perfer to have cash orders and would also be willing to discuss a further discount on quantity orders.

I can provide no warranty in addition to that provided by Intel, however that should be sufficient and I will assist you if necessary to obtain satisfaction. I also can not assure delivery of the 8008's in the event that there are insufficient orders, however since only a few more are necessary it seems as if there will be no problems. We hope to place an order by October and I will keep you notified of any developments if you place an order. I hope we can be of mutual benefit to each other.

Sincerely,

Robert W. Cook

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Interfacing a teletypewriter with an IC microprocessor

by Steven K. Roberts
Cybertronic Systems, Louisville, Ky.

The lengthy software service routine generally required to interface a teletypewriter and an IC microprocessor, such as the Intel 8008, can be eliminated by the circuit shown here. A shift register and some control logic are all that it takes, bringing total component cost to only about $6.50.

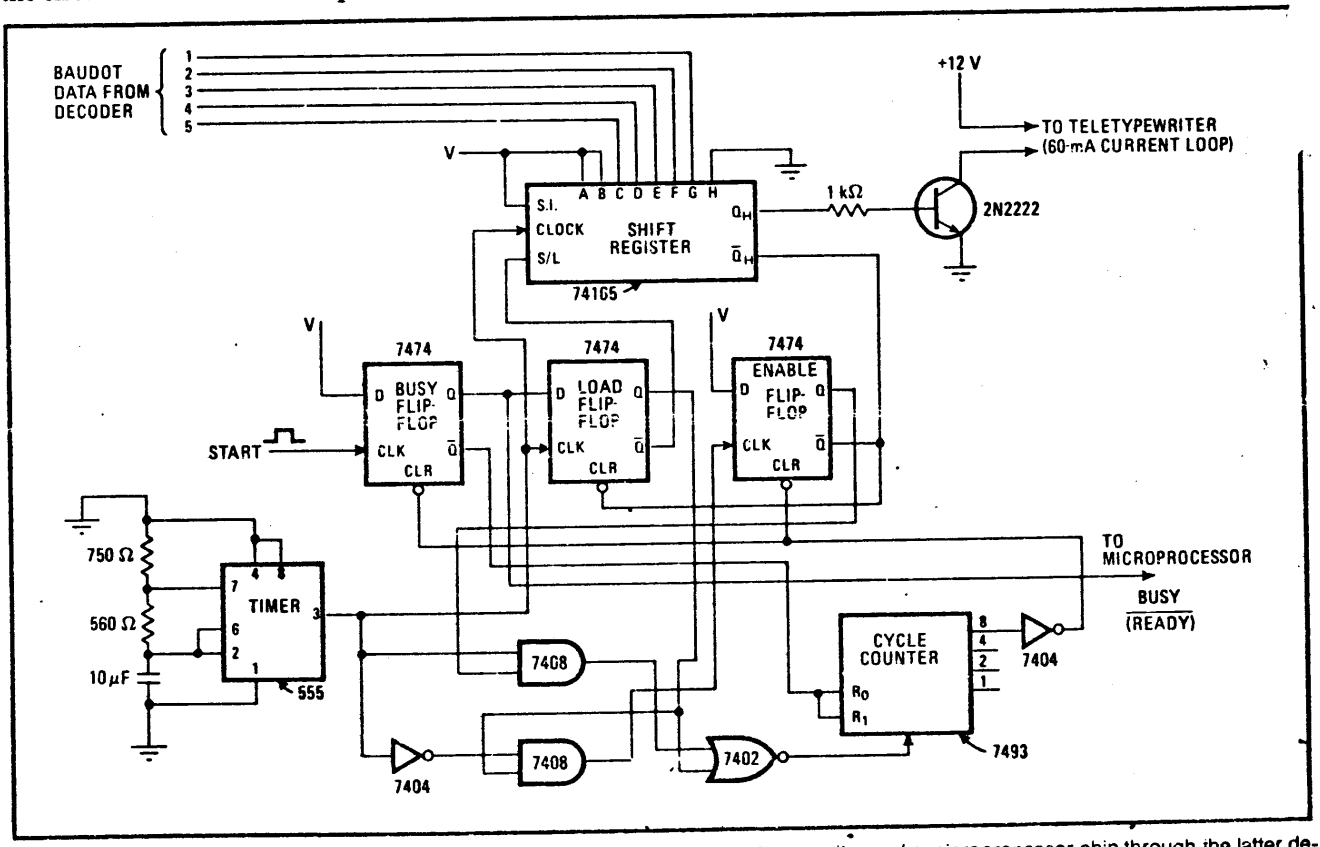
In the 8008 system, synchronization with the central-processing unit is accomplished through this microprocessor's READY line, making modification of the teletypewriter itself unnecessary. The hardware configuration given in the figure is designed for a 10-character-per-second Model 28 Teletype, which uses the five-level Baudot code. If the intended application will not easily accommodate data storage in the Baudot code, conversion may be accomplished with a read-only memory, such as National's MM5221TM. (A Model 33 Teletype presents no decoding problem.)

During the time that the input parallel data is valid, the circuit receives the START pulse, which sets the BUSY flip-flop and takes the READY line low. The BUSY flip-flop also removes the reset from the cycle counter and enables the LOAD flip-flop, which is set on the next clock pulse. This action loads the data at the input to the shift register and increments the cycle counter once.

On the succeeding clock pulse, the ENABLE flip-flop is set, and the data in the register begins to shift to the right. For each shift pulse, the cycle counter is incremented by one until it reaches a binary count of 8. Then, the BUSY and ENABLE flip-flops are both reset, and the READY signal is restored to the microprocessor so that the central-processing unit can resume operation.

In the data character presented to the shift register, bit H, which is constantly held low, corresponds to the teletypewriter START pulse. Similarly, the register's A and B bits are tied high, corresponding to the teletypewriter STOP pulse. Since the STOP signal must be applied to the teletypewriter for approximately 1.5 times longer than the other pulses, the BUSY flip-flop is reset on the falling edge of the clock, during the time that bit A is present at the register's Q_H output. The serial output of the register switches the 60-milliampere teletypewriter current loop through the transistor.

The clock signal for the circuit is derived from the IC timer that is free-running at approximately 75 hertz. For teletypewriters that operate at 6 characters per second, the clock frequency should be about 45.5 Hz. □



Software bypass. Digital interface circuit provides synchronization between a teletypewriter and a microprocessor chip through the latter device's READY line. Normally, a long software routine is needed to make the interface. The input data is in the parallel Baudot code, and the output is for a 10-character-per-second teletypewriter. A free-running IC timer is used to produce the clock signal.

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RGS ELECTRONICS
008A MICROCOMPUTER KIT
Preliminary Data

The RGS Electronics 008A Microcomputer Kit includes everything necessary to build the computer EXCEPT the cabinet, screws, nuts and assorted hardware, and the line cord and fuses. At this time, the kit is built on a 60-socket wire-wrap board measuring 8½" x 7½" x 1 1/8"; in the future, it will be built on p.c. boards. The manual for the wire-wrapped kits includes information on where to obtain wire-wrap tools and wire.

The kit includes the 8008 CPU chip, and either 2102's or 2602's for the memory, which is 1024 x 8 bits and is expandable. The kit also includes all the other TTL ICs necessary to the operation of the kit, and all the power supply parts except the fuse. The power supply is capable of +5 volts at 5 amps maximum, and -9 volts at 60 milliamps. The front panel LEDs and switches are also provided.

The front panel on a working 008A can be used to load memory and to debug programs. The manual contains, in addition to all the construction information, a short course on programming the 8008, and directions for interfacing to most peripheral devices. The 008A kit has an I/O bus, instead of the arrangement of I/O ports more usual with the 8008. This bus will handle up to 256 peripheral devices; the I/O instructions have been changed to reflect this change in structure.

The manual includes membership for one year in a software exchange program: we send you any new programs we develop, and you the users send us any programs you develop; we will act as a clearinghouse, making all the programs available to everyone. This service is available with purchase of the manual alone, as well as with the computer kit.

PRICES

008A Microcomputer Kit $375.00
(We offer a 20% discount on orders over $250.00, so the actual price for cash is $300.00.)

008A Microcomputer Manual $25.00
(Cost of manuals purchased separately may be applied to the cost of kits purchased later, without a manual.)

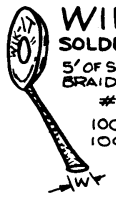
ORDER FROM: RGS Electronics, 3650 Charles St. Suite K, Santa Clara, California 95050. Telephone: (408) 247-0158
NO C.O.D.s!

P.21

ADEL NIBBLING TOOL

CUTS HOLES ANY SHAPE ANY SIZE OVER 7/16". UP TO 18 GA STEEL & 1/16" ALUMINUM OR PLASTIC.

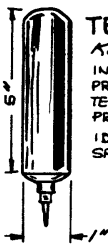
1 LB $6.25 EA



WIK-IT SOLDER-REMOVER

5' OF SOLDER REMOVING BRAID.

#	WIDTH	PRICE
1006	1/16"	1.49
1007	1/8"	1.69



TEST PROBE KIT

KEYSTONE #1810

INCLUDES PLASTIC HANDLE, PRE-PUNCHED TERMINAL BOARD, TERMINALS, BRASS SHIELD, & PROBE TIP.

IDEAL FOR SCOPE, VTVM, OR SPECIAL LOGIC PROBE.

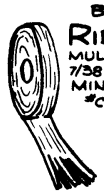
1.50 EA

WALDOM MOLEX SOLDER IC PINS

EASY TO USE BREAK-OFF IC CONNECTOR PINS.

50 STRIPS OF 7 PINS #05-30-0007
50 STRIPS OF 8 PINS #05-30-0008
ROLL OF 1,000 PINS #05-30-0001-1M
ROLL OF 2,000 PINS #05-30-0001-2M

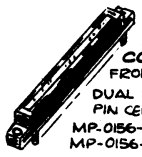
#05-30-0007	$5.54
-0008	5.87
-0001-1M	12.75
-0001-2M	25.50



BERK-TEK RIBBON CABLE

MULTI-COLOR, 30 AWG 7/38 STD, TYPE B.
MIN. 5 FEET ORDER.

#COND.	PRICE/FT
10	.25
20	.50
30	.75



EDGE BOARD CONNECTORS

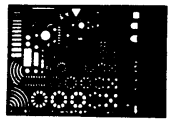
FROM MICRO PLASTICS

DUAL 22 PIN (44), .156 PIN CENTERS:

MP-0156-22-DP-1 (SOLDER-TAB) $2.75
MP-0156-22-DW-5 (WIRE-WRAP) $3.60
.025" SQ

TRW RESISTO-GUIDE

RESISTOR COLOR DECODER 30¢



QUAD TEMPLATE

CONTAINS: LOGIC SYMBOLS, SCHEMATIC SYMBOLS, PC BOARD PATTERNS, and DRILL JIG

KANDU STOCK #02-1 $3.00

MALLORY Sonalert

SC628 $6.99 (1-24)

FREQ: 2900 HZ
VOLTAGE: 6-28 VDC
CURRENT: 3-14 MA
INTENSITY: 68-80db

OTHER MODELS AVAILABLE

PD801 SPEEDY BEND

- LEAD BENDING TOOL -

by PRODUCTION DEVICES

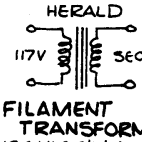
$1.95

1/2W RES
1W RES

MOTOROLA SEMICONDUCTOR DATA LIBRARY

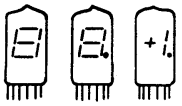
VOLUME 1: FIRST EDITION
VOLUME 2: SECOND EDITION
REFERENCE VOL: FOURTH ED.

ALL THREE BOOKS FOR: HEP #411 $7.50
SHIPPING WEIGHT: 12 LBS



HERALD FILAMENT TRANSFORMERS

12.6 VAC at 1 AMP
#T-56A $2.50
24 VAC at 1 AMP
#T-55A $2.60



TUNG-SOL DIGIVAC

VACUUM FLORESCENT READOUTS—COMPATIBLE WITH MOS IC'S.

DT1704C	STD	$5.30
DT1705E	W/DEC PT	5.75
DT1707C	±1.	5.40
DT1718A	SOCKET	.65

DT 1704C — DT 1705E — DT 1707C

Continental Specialties PROTO-CLIP

COST Under $5

DYNAGRIP PREVENTS SLIP

16 PIN PROTO-CLIP $4.75 EA

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FURNISHED IN LIGHT-WEIGHT, UNBREAKABLE, MOLDED CASE.

—NYLON— molex connectors

WM-72 CONTAINS AN ASSORTMENT OF THE POPULAR SIZES OF NYLON CONNECTORS WITH CRIMP TOOL AND PIN EJECTOR TOOL. FOR .062" PINS.
WM-72 KIT....$29.95 (3 lbs)

WM-50 SAME AS WM-70 EXCEPT FOR .093" DIA PINS.
WM-50 KIT....$24.95 (3 lbs)

—TERMINAL KITS—

K-180 CONTAINS 138 PCS OF THE MOST POPULAR INSULATED SOLDERLESS TERMINALS. CRIMP TOOL INCLUDED IN ALL KITS.
K-180 KIT.....$14.95

DELUXE ASSORTMENT CONTAINS 640 PCS. K-140 KIT.....$39.95

K-130 IS DELUXE ASSORTMENT WITH 630 PCS OF BOTH NON-INSULATED AND INSULATED SOLDERLESS TERMINALS.
K-130 KIT.....$31.95

K-220 IS DELUXE ASSORTMENT WITH 480 PCS OF THE MOST POPULAR MALE AND FEMALE INSULATED AND NON-INSULATED QUICK DISCONNECT TERMINALS.
K-220 KIT.....$32.95

SHIPPING WEIGHT (ALL KITS) 3 LBS.
OTHER WALDOM-MOLEX PRODUCTS IN STOCK AT KA.

SLIDE POTS from MALLORY

linear taper - all $1.25

MSC14L	10K
MSC24L	20K
MSC253L	25K
MSC54L	50K
MSC254L	250K
MSC754L	750K
M5D155L	1.5M

BLACK KNOB #M31 .15

CIRCUIT-STIK

PAC OF 5 COMPONENT CARRIERS:
#9521-005 (14 PIN) $3.29
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dry transfer LETTERING SETS

DATAK $5.95 #9581

TITLES FOR ELECTRONIC EQUIPMENT - 24 sheets (3x5") 2000 TITLES, 1/8" LTRS, BLACK.

TERMINAL AND CHASSIS MARKING KIT 24 sheets (3x5") OF LETTERS AND NUMBERS, 1/8" BLACK LTRS. #966 .....$5.95

CHEMICALS for ELECTRONICS

from TECH SPRAY (IN SPRAY CANS)

TRANSISTOR SILICONE GREASE 6 OZS $3.25
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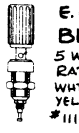
STRIPPER - ROSIN FLUX REMOVER. for PC BOARDS, CONNECTORS, etc NO. 1644-16S (16 OZ).....$2.49
ACRYLON - Clear ACRYLIC Spray NO. 1612-16S (16 OZ).....$1.49
ZAP IT - lubricant NO. 1666-7S (7 OZ).....$.99
MINUS 62 INSTANT CHILLER - finds thermal intermittents NO. 1669-15S (15 OZ).....$2.89

OTHER TECH SPRAY PRODUCTS AVAILABLE



E.F. JOHNSON BINDING POST

5 WAY BINDING POST, RATED AT 15A. COLORS: WHT, RED, BLK, GRN, ORN, YEL, BRN, BLU, VIO, GRY.
#111-0100-COLOR 38¢ EA

MALLORY ALKALINE DURACELL®

9 VOLT BATTERY $1.50

#MN1604B

REPLACES: 216, 222, 206, 006P-9V, 1604M, VS323, 15

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integrated circuit VOLTAGE REGULATORS

TYPE	EQUIV. TO	OUTPUT VOLT.	CURRENT	PACKAGE	PRICE
SG309K	LM309K	+5 VDC	1.0A	TO-3	$3.00
SG7812CK		+12	1.0	TO-3	3.25
SG7824CK		+24	1.0	TO-3	3.25
SG320K-05	LM320K-05	-5	1.0	TO-3	4.95
SG320K-12	LM320K-12	-12	1.0	TO-3	4.95
SG320K-15	LM320K-15	-15	1.0	TO-3	4.95
SG3501N		±15	.1	14 PIN DIP	5.25
SG3502N		±12 to ±25	.1	14 PIN DIP	5.25
SG1468T	MC1468G	±15	.1	10 PIN CAN	4.20
L129		+5	.60	PLASTIC TAB	2.10
L130		+12	.50	PLASTIC TAB	2.10
L131		+15	.45	PLASTIC TAB	2.10
ML723CP	µA723C	2 to 37	.15	14 PIN DIP	1.14

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DESOLDERING TOOL REMOVES SOLDER FAST & SIMPLE

MODEL SS011 $6.95

REPLACEMENT TIP SRT12 ..... $1.50 EA

TECH SPRAY features Kodak Eastman 910

2 GRAM TUBE

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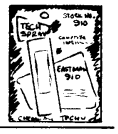


dual in-line sockets

FROM MICRO PLASTICS, INC

GLASS FILLED NYLON INSULATOR WITH GOLD-PLATED CONTACTS.

		PRICES	(1-49)	(50-99)	(100-249)
CS-3014-B-2	14 PIN	SOLDER-TAIL	.50	.43	.34
CW-3014-B-2	14 PIN	WIRE-WRAP	.60	.46	.37
CS-3016-B-2	16 PIN	SOLDER-TAIL	.60	.46	.36
CW-3016-B-2	16 PIN	WIRE-WRAP	.75	.55	.38

KA

(214) 634-7870
TWX 910 861 9028

For the economy-minded student or experimenter...

NEW PROTO BOARD-100

Here's a low cost, big 10 IC capacity breadboard kit with all the quality of QT Sockets and the best of the Proto Board series ... complete down to the last nut, bolt and screw. Includes 2 QT-35S Sockets, 1 QT-35B Bus Strip, 2.5 way binding posts, 4 rubber feet, screws, nuts, bolts, and easy assembly instructions.

COMPLETE KIT ...

$19.95 ORDER YOURS TODAY!

KA ELECTRONIC SALES
1220 MAJESTY DR · DALLAS, TEXAS 75247

MARK-8 MINICOMPUTER Parts and Pieces

THE FOLLOWING PARTS ARE ALL NEW FACTORY FRESH UNITS, NOT REJECTS THAT "MIGHT WORK" IF YOU'RE LUCKY.

TYPE	DESC.	#REQD	PRICE (EA)	REF. DES.
MF8008R	8 BIT MICROPROCESSOR	1	120.00	IC24 (CPU BD)
MF1101AP	256 BIT x 1 MEMORY	8+	7.50	IC1-IC8 (MEM. BD)
N8263	MULTIPLEXER	2	10.92	IC1, IC2 (MEM BD)
N8267	MULTIPLEXER	2	4.25	IC4, IC5 (INP MUX BD)
7400	TTL IC	15	.40	-
7402		3	.40	-
7404		8	.42	-
7410		2	.40	IC10, IC18 (CPU BD)
7442		5	1.80	-
7474		2	.90	IC8, IC12 (CPU BD)
7475		10	1.55	IC1-IC8 (OUTP BD), IC7, IC8
7476		3	.95	IC2, IC3, IC14 (CPU BD)
74123		2	2.05	IC1, IC2 (ADR BD)
74193		4	4.25	IC8, IC9, IC10, IC11 (ADR BD)
7420		1	.40	IC15 (CPU BD)
74L04	TTL IC, LOW POWER	3	.94	IC22, IC23, IC25 (CPU BD)
MV5054-1	RED LED	33	.50	D1-D32 (LED BD), D1 (PANEL)
4000.000 KHz	CRYSTAL TYPE EX	1	5.95	XTAL1 (CPU BD)
ST1-1	SPDT TOGGLE SWITCH	11	1.47	S1-S11 (PANEL)
ST1-5	SPDT MOMENTARY TOGGLE	5	2.01	S13-S17 (PANEL)
33 PF, 10%	DISC CAPACITOR (RMC)	1	.15	C1 (CPU BD)
680 PF, 1KV	" " (SKD-681K)	1	.12	C7 (ADR BD)
.01 µf, 25V	" " (MAG25I1)	6	.23	C1-C6 (ADR BD)
.1 µf, 12V	" " (MAG1201)	17	.23	-
1 µf, 25V	ELECTROLYTIC CAP (NUU)	1	.60	C2 (INP MUX BD)
100 µf, 25V	" " (ME-7G-100)	1	.51	C1 (LED BD)
09-52-3081	MOLEX CONNECTOR	14	.50	-
RESISTORS		ALL	.08	-

MARK-8 NEWSLETTER VOL. 1, NO. 3
12 OCTOBER 74

I HADN'T PLANNED TO DO ANOTHER NEWSLETTER FOR SEVERAL MORE WEEKS BUT MAIL HAS BEEN COMING IN SO RAPIDLY THAT I HAVE TO OR I'LL NEVER KEEP UP. WE NOW HAVE OVER 180 PARTICIPANTS. WHO KNOWS HOW MUCH BIGGER IT WILL BECOME?

BUGS - PAGE 4 INPUT MUX PARTS LIST SHOULD READ C1,3,4 0.1 MF DISK C2 100 MF 10 VOLT ELECTROLYTIC (BY ROBERT COOK)
IC3 ON CPU BOARD HAS NO GROUND. CONNECT INSULATED WIRE FROM PIN 4 TO GROUND RAIL AND CHECK FOR CHANGE-STATE OUTPUT ON PINS 10 AND 11. (I'M NOT SURE I UNDERSTAND THIS ONE.) IN CONNECTING THE BUS, NOTICE THAT FOIL DOES NOT CONNECT ALL OF THE INNER AND OUTER HOLES. (BY TERRY RITTER)
ADDRESS FOR MARTIN RESEARCH, 1825 S. HALSTED ST, CHICAGO, IL 60608

SOURCES FOR 8008 AND OTHER PARTS - NO NEW ONES HAVE APPEARED. WE HAVE REACHED A SIZE WHERE OUR ORGANIZATION SHOULD BE ABLE TO GET A VERY ATTRACTIVE QUANTITY DISCOUNT ON COMMON ITEMS WE ALL NEED SUCH AS 8008 AND 8080 CHIPS, MEMORY CHIPS, ETC. ROBERT COOK IS ALREADY INTO THIS. PERHAPS HE WILL CHECK IT OUT IN DETAIL AND LET US KNOW WHAT WE CAN DO.

OUTSTANDING NEWS - STEVE CIARCIA HAS DESIGNED AND TESTED A FOUR CHIP MODIFICATION TO TVT TO ADD COMPLETE SCROLLING CAPABILITY. THE CIRCUIT IS NOW IN THE MAIL AND WILL BE PUBLISHED IN THE NEXT NEWSLETTER.

DON SINGER, FOREST GROVE HIGH SCHOOL, FOREST GROVE, OREGON HAS A BASIC CROSS ASSEMBLER THAT RUNS ON A DATA GENERAL TIME SHARE BASIC SYSTEM AND COULD BE EASILY MODIFIED FOR OTHER BASICS.

ARTICLES WORTH LOOKING UP - "MICROCOMPUTERS--FROM THE USERS VIEWPOINT" BY HYMAN OLKEN, RESEARCH/DEVELOPMENT, OCT 74 DESCRIBES THE LAWRENCE RADIATION LABS 8008 SYSTEM OF MODULES AND THEIR USE AT THE LABS.

COMMENTS FROM CURRENT PARTICIPANTS

STEVEN CIARCIA HAS DEVELOPED THE SCROLLING SYSTEM FOR TVT, PROMISES TO PUT TOGETHER A CASSETTE RECORDER INTERFACE THAT WILL REALLY WORK USING A SYSTEM CALLED HARVARD BIPHASE AND HE WILL BE DEVELOPING A SPACEWAR GAMING SYSTEM.

DAVE CHAPMAN SENT A COPY OF MP PUBLISHING CO., BOX 378 BELMONT, MASS 02178 ARTICLES ECS-2 ($2.50) ON AN AUDIO CASSETTE MASS STORAGE SYSTEM. UNLESS I DIDN'T GET THE WHOLE THING, IT WOULD APPEAR NEARLY IMPOSSIBLE TO GET A RUNNING UNIT FROM THE INFO THERE. ECS-6 IS SUPPOSE TO BE A TAPE CONTROLLER BUT ISN'T PUBLISHED YET. HE WANTS TO KNOW WHERE HE CAN FIND A CHEAP DIGITAL PLOTTER (I'D LIKE TO KNOW WHERE TO FIND CHEAP STEPPING MOTORS?) AND WANTS TO BUILD A TV GRAPHICS TERMINAL WITH VECTOR AND CHARACTER GENERATORS. HE INCLUDED AN AD FOR ZIPPER, A CASSETTE SYSTEM BY PROGRESSIVE SYSTEMS, 215 FIRST STREET,

ROBERT COOK HAS PLACED HIS FIRST QUANTITY ORDER FOR 8008S AND SHOULD BE DELIVERING THEM BY NOW. HE IS STILL ACCEPTING ORDERS AT $80. HE IS INTERESTED IN 8080S (PLEASE FIND OUT HOW MUCH THEY WOULD COST US IN A QUANTITY ORDER, ROBERT.)

JAMES FRY ORDERED AN 8008 FROM ELECTRONIC DISCOUNT SALES AND THEIR PRICE HAS GONE UP TO $69.45. HE SAYS THEY WERE VERY SLOW. ALSO STAY AWAY FROM HAP AS ADVERTISED IN PE AS $2.00 GETS YOU NOTHING. HE WANTS TO KNOW IF ANYBODY CAN COMMENT ON RGS'S BOOK, HE WAS VERY IMPRESSED WITH MP PUBLISHING'S FIRST TWO EFFORTS AND RECOMMENDS JAMES ELECTRONICS, PO BOX 822, BELMONT CA 94002 AS FAST. JAMES WILL MEET ANY COMPETITOR'S PRICES IF THE AD IS SENT IN AND PROMISES 3-5 DAY DELIVERY ON MOST UNLISTED ICS.
HE IS STILL WORKING ON HIS TVT MODIFICATIONS AND HIS DESCRIPTION GIVES IT ALL THE FEATURES OF A HAZELTINE 3000. HE MADE SOME BOARDS THAT CAN BE USED FOR MODULE DEVELOPMENT WITH THE TVT SINCE THEY ACCEPT THE SAME MOLEX CONNECTORS AND HAVE PADS FOR 16 ICS. HE CAN GET MORE MADE FOR $3.00 EACH. HE SUGGESTS THAT WE ALL SEND LETTERS IN TO RE THANKING THEM FOR THE TVT AND MARK-8 ARTICLES AND SUGGEST THEY HAVE MORE AND A REGULAR COMPUTER COLUMN.

MAURY GOLDBERG WILL SOON FINISH HIS MARK-8 AND WILL INTERFACE IT WITH A FLOPPY DISC AND AN INTELLIGENT TERMINAL HE OWNS. HIS PART TIME BUSINESS IS LIQUIDATING MANUFACTURE'S EXCESS INVENTORIES. HE HAS A LOT OF PARTS FOR THE MARK-8 AVAILABLE. WRITE HIM AT SYRACUSE MANAGEMENT SERVICES, 1618 JAMES STREET, SYRACUSE, NY 13303. HE WANTS TO KNOW IF THERE IS ANY INTEREST IN A KIT OF PARTS.

DAN GOLENSKIE IS INTERESTED IN 8080'S. HE SAYS 2107A-8 4K RAMS ARE PRICED AT $12 EACH IN LOTS OF 100. CAN ANYONE DESIGN THE REFRESH CLOCKS ETC.?

ROBERT KELLY IS IN FAVOR OF THE LAWRENCE RAD LABS TRI-STATE INPUT BUS CONFIGURATION.

SUMNER S. LOOMIS, LOOMIS LABS IS ASSEMBLING A MARK-8 WHICH WILL BE USED AS A PROGRAMMABLE CONTROL CENTER FOR ANOTHER COMPUTER THAT USES CMOS LOGIC AND 4 CALCULATOR CHIPS. IT WILL BE INTERFACED WITH AN ANALOG COMPUTER, DIGITAL VOLTMETER, 11 X 17 PLOTTER, BOWMAR PRINTER, BAUDOT TTY, IBM CARD READ AND SEVERAL CASSETTE RECORDERS. HE PROMISES TO CONTRIBUTE SOME OF THIS INFORMATION SOON. HE HAS SOME COMMENTS ON THE MEMORY BOARD. USE MOLEX SOCKET PINS AND STAND THEM UP AS FAR FROM THE BOARD AS POSSIBLE. DO NOT INSTALL THE THRU BOARD WIRES UNTIL YOU HAVE CHECKED EACH ROW OF MEMORY SOCKETS FOR SHORTS AN INSPECT EVERY JOINT WITH A 10 POWER MAGNIFYING GLASS. TRYING TO DEBUG A MEMORY WITH SOFTWARE IS A LONG, HARD, (& INTERMITTENT) ROAD.

KEN A MCGINNIS WANTS EVERONE TO GET TOGETHER AND AGREE ON A MEMORY ELEMENT SUCH AS THE 2602 SO WE COULD ORDER ENOUGH TO GET THE PRICE DOWN. THE INTEL 8212 8 BIT LATCH WOULD BE NEAT TO. HE ALSO SENT A PRICE INFORMATION LIST FROM CONTROL LOGIC, INC FOR THEIR 8008 MODULES DISTRIBUTED BY INTER-LINK SYSTEMS, PO BOX 517, CUPERTINO, CA 95014. THESE ARE THE LAWRENCE RAD LAB MODULES. WRITE FOR LITERATURE.

TOM PARQUETTE IS EXCITED ABOUT 8080 SYSTEMS AND IS IN THE PLANNING STAGE OF A PUNCHED CARD READER AND/OR PUNCH. HE IS PLEASED WITH SOLID STATE SYSTEMS AS A SUPPLIER.

CABELL A PEARSE SUGGESTS SOLID STATE SYSTEMS FOR IC SOCKETS, B&F FOR WIRE-WRAP WIRE, WEIRNU, PO BOX 1307 COLTON, CA 92324 FOR 1101 AND 2102. HE WAS IMPRESSED WITH THE SCELBI-8H USER MANUAL AND LIKES THE MP PUBLISHING CO EXPERIMENTERS COMPUTER SYSTEM SERIES. WRITE BOX 378-P, BELMONT, MASS 02178 FOR A FREE CATALOG DESCRIBING SERIES.

LAURENCE PLATE SUGGEST CLEANING IC PAD HOLES BY USING WIK-IT ON ONE SIDE TO REMOVE EXCESS SOLDER, THEN USE SOLDERING IRON AND #22 WIRE TO CLEAR HOLE. HE SUGGESTS ONLY ONE BOARD OF 1101'S AND USE OF HIGHER DENSITY CHIPS FOR THE REST OF THE MEMORY. THE NEED FOR STANDARDS IS SO ESSENTIAL THAT IS PROPOSING SANTA BARBARA AS THE UNOFFICIAL MARK-8 CAPITOL OF THE WORLD AND THE OBVIOUS PLACE FOR A CONFERENCE. (PERHAPS HE AND I CAN GET TOGETHER AND WRITE DOWN OUR IDEAS FOR STANDARDS AND PRINT THEM FOR COMMENT.)

TED J. POULOS IS STRUGGLING TO DEBUG HIS MARK-8 AND IS PROMOTING HIS COMPANY, DIGI-CRAFT ELECTRONICS POB 94, BROOKLINE MASS 02145. A CATALOG WILL BE AVAILABLE IN MID NOV AND HE NOW HAS 1101'S AT 8 FOR $21 POSTPAID AND MOLEX CONNECTORS & MATING WAFER PIN ASSEMBLIES FOR 50 AND 25 CENTS.

R. RILEY SAYS THE ARRL HANDBOOK AND BACK ISSUES OF QST HAVE MODEM PLANS. ALSO MOTOROLA APPLICATION NOTE AN-4-91 FREE FROM MOTOROLA. HE RECOM- INTERNATIONAL ELECTRONICS FOR IC'S AND MENTIONS THAT QST HAS PUBLISHED PLANS FOR A BAUDOT TO ASCII CONVERSION.

TERRY RITTER HAS A RUNNING MARK-8 AND SENT DETAILS ON HIS KEYBOARD INTER- FACE AND A LISTING OF SIMPLOADER, A OCTAL KEYBOARD DATA ENTRY PRO- GRAM. DETAILS WILL APPEAR IN THE NEXT ISSUE. HE RECOMMENDS NOT USING MOLEX CONNECTORS SO THE UNIT CAN BE PLACED ON 5 DIFFERENT SIDES FOR TROUBLE-SHOOTING. A PULSE DETECTING PROBE IS ESSENTIAL FOR TROUBLE- SHOOTING AND BACK LIGHT THE BOARDS TO CHECK FOR SOLDER BRIDGES. HE WILL GLADLY HELP WITH TROUBLE SHOOTING HINTS BUT ONLY IF YOU ENCLOSE A SASE. WHOEVER DOES THE 8080 ARTICLE SHOULD MAKE IT MUCH EASIER TO BUILD. HE HAS HAD FREQUENT PROBLEMS WITH THE SWITCHES EVEN THO THEY WERE GOOD QUALITY. EXTRA DEBOUNCING MAY HAVE TO BE ADDED. FOR ADDING CIRCUITS TO THE BOARD TERRY SUGGESTS MOUNTING THE IC'S ON THE BOARD TOP DOWN WITH GLUE WITH WIRES CONNECTING THE PINS AND PC RUNS. HE IS NOW WORKING ON A HARDWARE ROM AND TTY DRIVER.

DR. WILLIAM SCHENKER SAYS BILL GODBOUT HAS AN EXCELLENT REPUTATION AS A SUPPLIER IN THE BAY AREA AND THAT FIVE OF THEM IN THE BAY AREA HAVE ORGANIZED A LOOSE GROUP AROUND TVT CONSTRUCTION. HE IS IN A COM- PUTER SCIENCE PROGRAM WHICH HAS A STRONG LIASON WITH LAWRENCE RAD LABS AND SHOULD BE ABLE TO OBTAIN INFORMATION. HE IS MOSTLY INTERESTED IN 8080 SYSTEMS AND MAY BE WORKING INTO COMPUTER APPLICATIONS FOR DIAGNOSTIC MEDICINE AND HEALTH CARE DELIVERY SYSTEMS.

ROGER SMITH'S ARTICLE ON ADDING A UART TO THE TVT TO DRIVE A TTY AND CASSETTE RECORDER LOOKS GOOD AND WILL APPEAR IN THE DEC RE. HIS RECORD- ING METHOD USES A TONE FOR 1'S AND NO TONE FOR 0'S.

PETER SPERRI SENT IN A COPY OF THE ELECTRONICS MAG TAPE INTERFACE.

JONATHAN TITUS SUGGESTS BENDING THE 1101 LEADS HORIZONTALLY THAT DON'T NEED TO GO THRU THE BOARDS AND SOLDERING THEM LIKE A FLAT PAK. ALSO TEST THEM FIRST. TO EXPAND THE INPUT TO A BUS SYSTEM, REMOVE THE 7442 DE- CODER ON INPUT MUX BOARD AND RUN 2 JUMPERS, FROM IC PAD 8 TO 1 AND 2 TO 16. INPUT PORT 0 BECOMES THE INPUT BUS PORT AND 1 IS NOT USED. HE WILL HAVE MORE ON THIS IN FUTURE ISSUES OF RE. HE SUGGESTS WESTERN DIGITAL'S BAUDOT UART FOR BAUDOT TTY'S. HE GAVE PERMISSION TO PRINT THE VERY NICE TROUBLESHOOTING PROBE CIRCUITS.

DARRELL WOOD SENT IN THE ARTICLES ON CASSETTE INTERFACES.

MAX L. WYMORE IS A PATENT ATTORNEY AND IS BUILDING THE MARK-8 AND TVT TO GAIN COMPUTER EXPERIENCE.

ADDITIONS TO ROSTER AND COMMENTS OF PARTICIPANTS AS OF OCT 12, 1974

A. C. ACTON, BOX 31, MIDLAND, MI 48640 IS INTERESTESTED IN INVESTIGATION AND SIMULATION OF INDUSTRIAL MINICOMPUTER APPLICATIONS ESPECIALLY IN REGARD TO INSTRUMENTATION, PROCESS MONITORING AND SERVO CONTROL AND WANTS TO INTERFACE TO TVT, HAM-GRADE TTY, GRAPHIC PLOTTERS, AND SERVO ACTUATORS.

VICTOR W. AMOTH, 228 FOX ROAD, MEDIA, PA 19063 WILL USE TVT FOR I/O, WANTS A CASSETTE TAPE INTERFACE AND WILL TRY TO RUN HIS MODEL RAILROAD IF HE CAN WORK OUT SENSORS FOR IT.

EDWARD E. ANDERSON, 813-23 ST., COLUMBUS, GEORGIA 31904 WILL USE THE TVT, WANTS TO INTERFACE A CASSETTE AND CALC CHIP AND WANTS TO WORK ON A BASIC AND FORTRAN COMPILER.

JEFFERY AUGENSTEIN MD/PHD, 1400 NW 10 AVE. SUITE 2M, MIAMI, FL 33136 IS WITH THE UNIV OF MIAMI, AUDIOLOGY RESEARCH LABS AND THEY HAVE LABORATORY APPLICATIONS FOR THE MARK-8.

DR. G. G. BALAZS, DIRECTOR, COMPUTER CENTER, VIRGINIA MILITARY INSTITUTE, LEXINGTON, VIRGINIA 24450

DAVID A. BARKER, 1101 GRAD HOUSE WEST, WEST LAFAYETTE, IND 47906

C. S. BAUER, IEMS DEPT., FLORIDA TECH. UNIV., PO BOX 25000, ORLANDO, FLORIDA 32816 SUGGESTS THAT THE GROUP COULD CONSIDER SERVING AS AN EXCHANGE MEDIUM FOR INFORMATION ON SOURCES AND PRICES FOR COMPONENTS. THEY ARE TRYING TO LOCATE "ZERO-INSERTION FORCE" IC SOCKETS.

EUGENE M. BEHRENS, 20631 S.W. 116 ROAD, MIAMI, FL 33157

RICHARD C. BEMIS, 402 S. HUMBOLDT, DENVER, CO 80209 SAYS THAT WE MAY BE NIBBLING AT THE TOP OF A VERY LARGE ICEBURG WITH THE USER GROUP. (IT APPEARS THAT YOU ARE RIGHT RICHARD.) HE SUGGESTS THAT A FLOPPY DISK WILL BE NECESSARY TO REALIZE THE MARK-8'S FULL POTENTIAL AND SUGGESTS LOOKING AT THE COMPUCORP ALPHA CALCULATOR AS AN EXAMPLE OF WHAT CAN BE DONE WITH A SOPHISTICATED PROGRAMMABLE CALCULATOR TYPE LANGUAGE IN A SMALL MACHINE.

J. P. BERNIER, 1005 GRENOBLE, STE FOY, QUE 10, GIV 228, (QUEBEC, CANADA) WORKS IN DIGITAL DEVICES AND ACQUISITION SYSTEMS BOTH STATIC AND DYNAMIC AND HE SUGGESTS INSPECTING THE BOARDS VERY CAREFULLY FOR SHORTS, USE MOLEX SOCKET PINS FOR ALL ICS, AND HE ORDERED 60 PIN CONNECTORS INSTEAD OF USING THE BUSS WIRES.

JAMES RILEY BODDIE, PATIO APT. 216, 420 N. DEAN ROAD, AUBURN, ALABAMA 36830 IS A GRAD STUDENT IN EE AT AUBURN UNIV. HIS SYSTEM WILL INCLUDE 1K, KEYBOARD, AND A CRT CHARACTER DISPLAY. HE IS INTERESTED IN PROGRAMMING GAMES AND HOUSEHOLD CONTROL FUNCTIONS.

FRED A BOGGS, 1803 ROSE ST., PORT TOWNSEND, WASH. 98368

JAY BOWDEN, 1613 ENCINO DR., ESCONDIDO, CA 92025 IS A FRESHMAN AT PALOMAR COLLEGE, SAN MARCOS, CA AND HOPES TO BE ABLE TO PROGRAM OPERATIONS IN A SYMBOLIC INSTRUCTION CODE USING MATH OPERATORS AND CERTAIN HIGH LEVEL LANGUAGE STATEMENTS.

DAVE BOWLES, 4501 GLEN HAVEN ROAD, SOQUEL, CA 95073 IS INTERESTED IN ACCOUNTING AND STOCK AND INVENTORY CONTROL FOR A SMALL BUSINESS, CONTROL OF A MUSIC SYNTHESIZER, MODULATION TRANSFER FUNCTION DATA REDUCTION, AND A SYSTEM FOR OPTICAL IMAGE INTENSIFYING SYSTEMS.

DENNIS BURKE, 108 N. HIDALGO AVE., ALHAMBRA, CA 91801 WANTS TO KNOW WHAT KIND OF PROGRAMS ARE AVAILABLE TO USERS AND IS INTERESTED IN GRAPHICS AND FILE TYPE COMPUTING. HE IS WORKING ON HIS OWN TV DISPLAY WHICH WILL WORK ON ANY SCOPE OR MODIFIED TV DISPLAY, WILL DISPLAY 512 CHARACTERS WITH A VIDEO FREQ UNDER 1 MEG AND A 60 HZ REFRESH RATE. PARTS COST IS UNDER $100. HE MENTIONS 256 WORD PROMS AT $37.50 FROM POLY PAKS AND WANTS TO KNOW IF THERE IS ANY INTEREST IN 8080'S.

W. H. BURTNER, RR 2 BOX 267, VALPARAISO, IND. 46383 IS WAITING TO START UNTIL THE BUGS ARE OUT AND IS VERY MUCH INTO MUSIC SYNTHESIZERS AND WOULD LIKE TO DEVELOP THE MARK-8 AS A SORT OF HIGH CLASS SEQUENCER AND CONTROLLER FOR A KIT SYNTHESIZER HE HAS COMPLETED.

VINCENT BUSCEMI, NEWFIELD HIGH SCHOOL, MARSHALL DRIVE, SELDEN, NY 11784

JOHN N. CALHOUN, PROGRAMMING ANALYST, SYSTEMS & PROGRAMMING DEPT., EDUCATIONAL TESTING SERVICE, 1947 CENTER STREET, BERKELEY, CA 94704

JOHN T. CRAIG, VARIAN DATA MACHINES, 2722 MICHELSON DRIVE, IRVINE, CA, 92664

JAN VAN DIJK, 2062 NW RAMSEY DR., PORTLAND, OREGON 97229

JAMES A EBY, RR #1, BOX 337A2, HARBOURTON-WOODSVILLE RD., PENNINGTON, NJ 08534

V. ECHEVERRIA, 4235 BANKS, NEW ORLEANS, LA 70119

ROGER B. FRANK, DIGITAL EQUIPMENT CORP., PO BOX 969, LOS ALAMOS, NM 87544 HAS HAD AN 8008 SYSTEM RUNNING FOR ABOUT 14 MONTHS WITH ABOUT 16K OF SEMICOND. MEMORY, ROM BOOTSTRAP, HIGH SPEED TAPE READER, CASSETTE TAPE, AND TTY WITH SOFTWARE SUPPORT INCLUDING AN EDITOR AND ASSEMBLER WITH A COMPLEX MONITOR. HE DEVELOPED HIS SYSTEM AS A HOBBY WHILE A DESIGN ENGINEER FOR ANOTHER COMPANY AND IS PURSUING THRU CHANNELS THE POSSIBILITY OF CONTRIBUITING THIS INFORMATION TO THE GROUP.

MAURY GOLDBERG, CELETRON COMMUNICATIONS CORP., 1618 JAMES ST., SYRACUSE, NY 13203

BILL GOUGH, 310-B SOUTH COLLINS, ARLINGTON, TX 76010 IS BUILDING A 4K MARK-8 WITH TVT AND HAS BEEN A PROGRAMMER FOR 15 YEARS WITH DIGITAL ELECTRONICS AS A HOBBY. HE HAS SOME ELABORATE IDEAS FOR A VERBAL RESPONSE UNIT USING 2 COMPUTER CONTROLLED CASSETTE TAPE RECORDERS.

DAVID W. GROSS, 924 NE CROXTON AVE., GRANTS PASS, OREGON 97526 IS A SOPHOMORE IN HIGH SCHOOL AND HAS BEEN SERIOUSLY INTERESTED IN COMPUTERS FOR THE LAST TWO YEARS. HIS MARK-8 IS NEARLY FINISHED AND HE IS STILL HAVING TROUBLE FINDING THE SHIFT REGISTERS FOR THE TVT.

R. G. GUENTHER, DDS, 100 MAIN ST. WEST, HAMILTON, ONTARIO CANADA, L8S 1B3

STEVEN L. GUERRA, PO BOX 429, SIERRA BLANCA, TX 79751

W. A. GUINN, 480 JAMUL CT., CHULA VISTA, CA 92011 WANTS HIS CHILDREN TO USE THE SYSTEM IN DOING THEIR SCHOOL WORK AND IS INTERESTED IN A PORTABLE SYSTEM AND WANTS TO DO ENVIRONMENTAL CONTROL FOR HIS HOUSE AND GREEN HOUSE.

DAVID R. HANUS, 402 ARNOLD BLVD. #29, ABILENE, TX 79605 BUILT THE TVT AND IT ENDED UP COSTING FAR MORE THAN IT WAS SUPPOSE TO SO HE IS CAUTIOUS ABOUT STARTING THE MARK-8 TOO SOON. HE WOULD USE IT FOR INVENTORY LISTS, COMIPILING LISTS OF CROSS-REFERENCED PARTS, AND WITH THE AID OF A CALCULATOR INTERFACE, TO FURTHER HIS EDUCATION IN PHYSICS. HE HAS FOUND HAMILTON-AVNET AND CRAMER SUPPLY OF DALLAS HELPFUL IN OBTAINING SIGNETIC ICS.

TERRY G. HARRIS, 417 NORTHWESTERN DRIVE, GRAND FORKS, N. DAK. 58201 WANTS TO BUILD THE CRT I/O IN RE AND WOULD USE HIS MARK-8 FOR MEAL PLANNING AND SORTING DATA FOR PARTICULAR ITEMS OF INTEREST.

GREGORY W. HART, 8948 RAMSTAD AVE., FAIR OAKS, CA 95628

JAMES HOPKINS, 29 GRANDVIEW AVE., PITMAN, NJ 08071 PLANS TO DEVELOP A SCIENTIFIC NOTATION PACKAGE USING 5 WORDS PER NUMBER. HE IS INTERESTED IN DEVELOPING A DETAILED USER MANUAL WITH DISCUSSION AND USES OF ALL ARITHMETIC AND LOGICAL OPERATIONS.

JOHN JAMES, 1597 MONUMENT ST., CONCORD, MA 01742 PLANS TO BUILD OR PROGRAM A 2-WAY MORSE CODE TRANSLATOR, COMPUTER TERMINAL, AND DO DATA ACQUISITION AND PROCESSING OF VOICE SIGNALS.

C. K. JOHANSEN, ORION RESEARCH INC., 380 PUTNAM AVE., CAMBRIDGE, MA 02139

DOUGLAS W. KILGORE, 803 JAMES DRIVE, RICHARDSON, TX 75080

MORRIS KRIEGER, 37 EIGHTH AVE., BROOKLYN, NY 11217 FEELS THAT THERE ARE GOING TO BE SUBSEQUENT MODELS, EITHER LARGER, BETTER, OR FASTER AND IS GOING TO WAIT AND SEE WHAT THE FUTURE HOLDS.

JAMES M. LAMIELL, 1615 COLORADO BLVD., DENVER, CO 80220

J. E. LENCOSKI, 327 GRANT AVE., MIDDLESEX, NJ 08846

ANDREW W. LEPP, 1517 ALTA VISTA, OWOSSO, MICHIGAN 48867 IS IN GRAD SCHOOL IN COMPUTER SCIENCE AT THE UNIVERSITY OF ARKANSAS.

JEFF LESINSKI, 1241 STALEY ROAD, GRAND ISLAND, NY 14072 IS CONSTRUCTING A 2K MARK-8 WITH TVT, TWO OUTPUT BOARDS, AND THE SIGNETIC PHASE LOCK LOOP AUDIO CASSETTE I/O. HE PLANS TO ADD A CALCULATOR AND CLOCK CHIP, DUAL COMPUTER CONTROLLED CASSETTE DRIVES AND A D/A CONVERTER AND MODEM. HE IS 3RD YEAR GRAD STUDENT IN COMPUTER SCIENCE AT STATE UNIV OF NY AT BUFFALO AND IS INTERESTED IN ARTIFICIAL INTELLIGENCE BUT IS REGAINING INTEREST IN HARDWARE BECAUSE OF MICROCOMPUTER DEVELOPMENTS. HE HOPES TO USE THE MARK-8 TO DEMONSTRATE FEASIBILITY AS A MASS PRODUCED HOME APPLIANCE AND IS CURRENTLY WRITING AN ASSEMBLER AND SIMULATOR IN FORTRAN.

PHILIP E. LEVINSON, 875 NASSAU ROAD, UNIONDALE, LI, NY 11553

STEVEN LORENZ, 163 WEST MAIN ST., NEWARK, DE 19711 IS A SENIOR AT UNIV OF DELAWARE IN EE AND IS USING THE MARK-8 AS A SENIOR DESIGN PROJECT.

JOHN M. MCCOY, 420 WALLACE AVE., LOUISVILLE, KY 40207

JOHN W. NALL, COMPUTER RESEARCH SPECIALIST, FLORIDA STATE UNIV, COMPUTER CENTER, MATH BLDG. RM 110, TALLAHASSEE, FL 32306

ALAN F. NEEL, 1435 JUDSON, BOULDER, CO 80303 WOULD LIKE A LIST OF RECOMMENDED PARTS SUPPLIERS AS HE IS HAVING TROUBLE FINDING SOME OF THE PARTS.

ROBERT W. OILER, 355 1/2 S. STATE ST., WESTERVILLE, OHIO 43081 WORKS IN TV REPAIR AND IS TRYING TO THINK UP WAYS TO MAKE HIS JOB EASIER USING THE MARK-8.

MARK PETERSON, TEACHING SPECIALIST, UNIV OF MINNESOTA, DULUTH, DEPARTMENT OF INDUSTRIAL EDUCATION, DULUTH, MN 55812 IS PRESENTLY USING A GE 312 AND IS INTERESTED IN USING THE MARK-8 AS A MINICOMPUTER/REMOTE ENTRY TERMINAL COMBINATION.

C. A. PICKARD, 199 N. PURDUE, OAK RIDGE, TENN. 37830

GARY T. POST, 475 B BROOKS, LEMOORE, CA 93245

W. A. RIGGERT, DDS, 10300 WEST NINE MILE ROAD, OAK PARK, MICHIGAN INTENDS TO USE THE MARK-8 FOR STANDARD BUSINESS PROCESSING AND SEVERAL VERY SPECIALIZED DENTAL PROGRAMS AND WANTS INFO CONCERNING CASSETTE TAPE DRIVES AND LOW-COST SLOW PRINT MECHANISMS.

J. R. ROEHRIG, 28 HICKORY RD., WELLESLEY, MASS., 02181 HAS A CASSETTE TAPE UNIT RUNNING THAT WORKS REASONABLY WELL BUT HIS PROBLEM IS GETTING GOOD TAPE. EVEN WITH "SCOTCH" HE GETS 2 ERRORS PER PAGE ON THE TVT.

R. N. RUBINSTEIN, 310 LENOX RD., BROOKLYN, NY 11226

RMCS WELDON RYE USN, TACRON ONE NAB CORONADO, SAN DIEGO, CA 92155 HAS SOME TTY EQUIPMENT, A VIDEO MONITOR AND A SCOPE HE WILL USE AS PERIPHERALS AND IS AN ACTIVE HAM AND MARS MEMBER AND CAN SEE USES FOR THE MARK-8 IN THAT FIELD.

ALBERT SARDO, 2032 SW EXPRESSWAY, SAN JOSE, CA 95126 HAS JUST STARTED STUDYING EE AT SAN JOSE STATE COLLEGE AND IS HOPING TO DEVELOP A HIGH LEVEL LANGUAGE IN THE FUTURE FOR THE MARK-8 AND WILL USE IT FOR STATISTICAL AND MATHEMATICAL WORK.

MICHAEL G. SCOTT, ROUTE 1, BOX 105, KIRON, IOWA 51448 IS A JUNIOR IN HIGH SCHOOL AND ON HIS PRESENT SALARY, IT WILL BE A WHILE BEFORE HE CAN TACKLE THE MARK-8. HE IS WORKING ON A DEVICE THAT READS, WRITES, AND REMEMBERS OCTAL CODES AND CONVERTS THEM TO THEIR BINARY COUNTERPARTS.

MARK SEBERN, 218 MOSSMAN RD., SUBURY, MA 01776

CHARLES SIBBITS, 413 N. BLACK HORSE PIKE, RUNNEMEDE, NJ 08078 IS A 3RD YEAR STUDENT IN RADIO AND TV REPAIR AT CAMDEN COUNTY VOCATIONAL SCHOOL. HE WANTS TO ADD A CALCULATOR TYPE KEYBOARD FOR FASTER ENTRY AND A ROM FOR NONVOLATILE PROGRAM STORAGE. HE IS PRIMARILY INTERESTED IN BUSINESS DATA PROCESSING AND ANY SOFTWARE AVAILABLE FOR THIS PURPOSE.

DAVID SILACCI, D. QUON, 1405 48TH AVE. #3, SAN FRANCISCO, CA 94122

RAYMOND J. SMITH, WKYC-TV, 1403 EAST SIXTHS/ ST., CLEVLAND, OHIO 44114

ROBERT W. THOMAS, 910 SONMAN AVE., PORTAGE, PA 15946 IS INTERESTED IN A HIGH SPEED CRT INTERFACE AND MASS STORAGE DEVICES AND WILL USE THE MARK-8 TO CONTROL A ZONED HEATING SYSTEM, A FIRE AND BURGLAR ALARM SYSTEM IN HIS HOME, A HOME FINANCIAL SYSTEM, AND INVENTORY OF FOOD AND SUPPLIES.

PETER VICKERS, 162 NEHOIDEN ST., NEEDHAM, MA 02192

JAMES R. VOIGT, 1903 N. 23RD ST., SHEBOGGAN, WIS 53081

JOHN E. WAHL, APT. B-2, 3334 ZION, EL PASO, TX 79904

JERRY WALKER, 761 CLAYTON, SAN FRANCISCO, CA 94117

JOSEPH WEINTRAUB, 46-16 65TH PLACE, WOODSIDE, NY 11377 IS MAINLY INTERESTED IN COMPUTER GRAPHICS AS HE IS PROFESSIONALLY A PROGRAMMER AND PRIVATELY, A FILM-MAKER AND IS INTERESTED IN ANY INFORMATION IN THIS AREA.

STEVEN J. WINICK, APT. 210, 8401 MANCHESTER RD., SILVER SPRING, MD 20901

WORD PROCESSING SYSTEMS, 10955 GRANADA LANE SUITE 302, OVERLAND PARK, KANSAS 66211

Putting data on an ordinary audio recorder

Here's a way to use any single-track audio recorder to record digital data. The system, useful in many non-critical applications, makes only one requirement on the recorder (either reel-to-reel or cassette)—a frequency response to 7 kHz.

The circuit uses four phase-locked loop ICs, giving you a complete data-recording system with two recorded frequencies on a single track. Further, the circuit needs no timing channel to strobe-off the data, nor does it need a third frequency for null.

The parameters chosen for the circuit give you a digital recording rate of 800 Hz, or 100 8-bit char./s. Because an FSK recording system is used, you need not modify the recorder's voice recording and playback electronics. In fact, you can record voice messages to identify various sections of the tape. To incorporate redundancy of the stored data, simply use a 2-channel (stereo) recorder. An FSK detector on each channel, with the data outputs OR'd, recovers recorded *1*'s and thus protects against dropouts.

The FSK detector detects 6.4 kHz as a *1* and 4.8 kHz as a *0*. Because of the RZ FSK recording scheme, a *0* is recorded as 4.8 kHz for the entire bit period, while a *1* is recorded as 6.4 kHz for about 60% of the period and as 4.8 kHz for the remainder of the period. This 60% bit-duty-cycle ensures that the clock will synchronize with a negative transition during the time that a *1* should be detected.

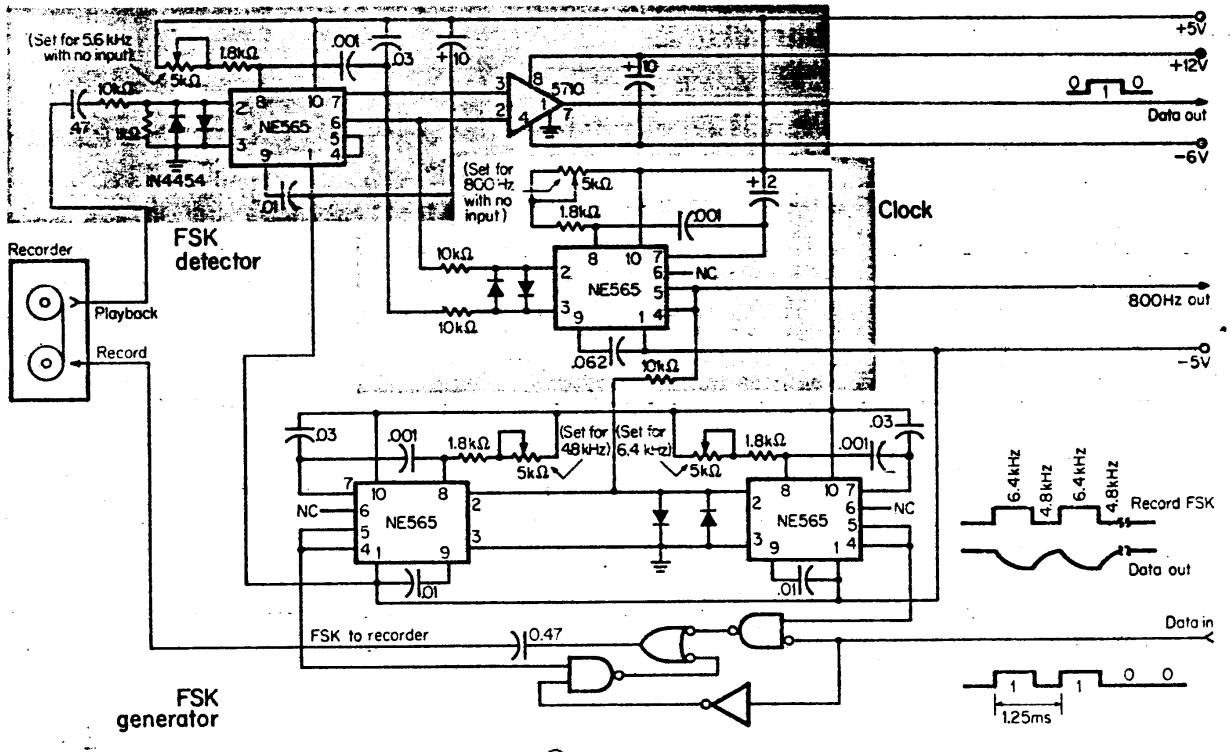
The system runs at 800 Hz. When the data pulses are extracted from the recorded data, the clock is synchronized to the data. The clock will stay in sync with up to seven successive *0*'s. You can meet this condition by using odd parity so one bit out of eight is always a *1*.

The FSK generator consists of two oscillators locked to the 800-Hz system clock, but oscillating at 6.4 kHz and 4.8 kHz. The incoming data to be recorded selects either oscillator as the frequency to be recorded. The high-frequency rolloff characteristic of the recorder automatically takes care of harmonic suppression of the square-wave output.

For more information on Signetics' phase-locked loops, write Signetics Corp., 811 E. Arques Ave., Sunnyvale, Calif. 94086.

Circle Reader Service #212

(Editor's note: this idea is credited to Daniel Chin, Burlington, Mass. and is used courtesy of Signetics Corp.)



[illegible] computer data with [illegible] cassette recorder

Page40

[illegible]hardt
[illegible] Mass.

Two [illegible] interface circuits permit data from a teletypewriter [illegible] recorded and played back on a portable cassette tape recorder. This means that a conventional tape recorder can be employed as a compact [illegible] storage device for minicomputers with a teletypewriter operating as the only input/output equipment. And remember that a single 120-minute cassette will hold as much information as 600 feet of paper tape.

Teletypewriter data is transmitted at the rate of 10 characters per second (110 bits per second), a frequency that is far too low for most audio recorders. Therefore, the data is converted to tone bursts at a frequency the recorder can use. On playback, the tone bursts are detected, and the original data format is reconstructed.

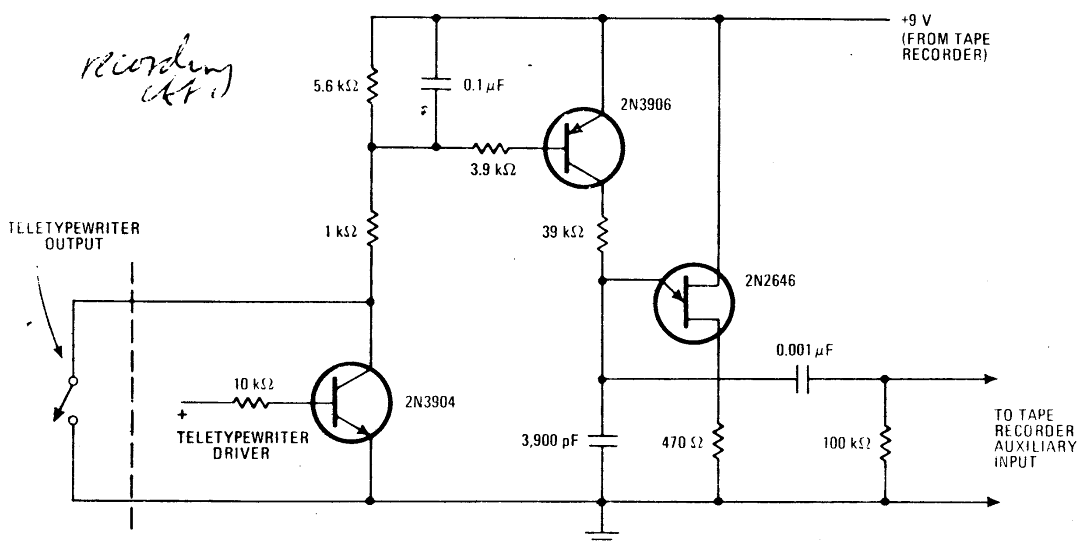
The teletypewriter-to-recorder interface circuit (a) can be driven either directly by the teletypewriter output or by the circuitry that drives the teletypewriter. The output of a teletypewriter resembles the opening and closing of a switch. In the interface circuit, this switching waveform is first filtered slightly to remove bounce, and then it is used to gate a unijunction oscillator. If a teletypewriter driver is used instead as the input device, its drive current is fed to the base of a transistor that simulates the teletypewriter's switching action.

The circuit's output is a sawtooth waveform having a frequency of 6 kilohertz. It is applied to the recorder's auxiliary input (high-impedance low-sensitivity input). If the recorder does not have this input, it can be simulated by placing a 470-kilohm resistor in series with the microphone input.

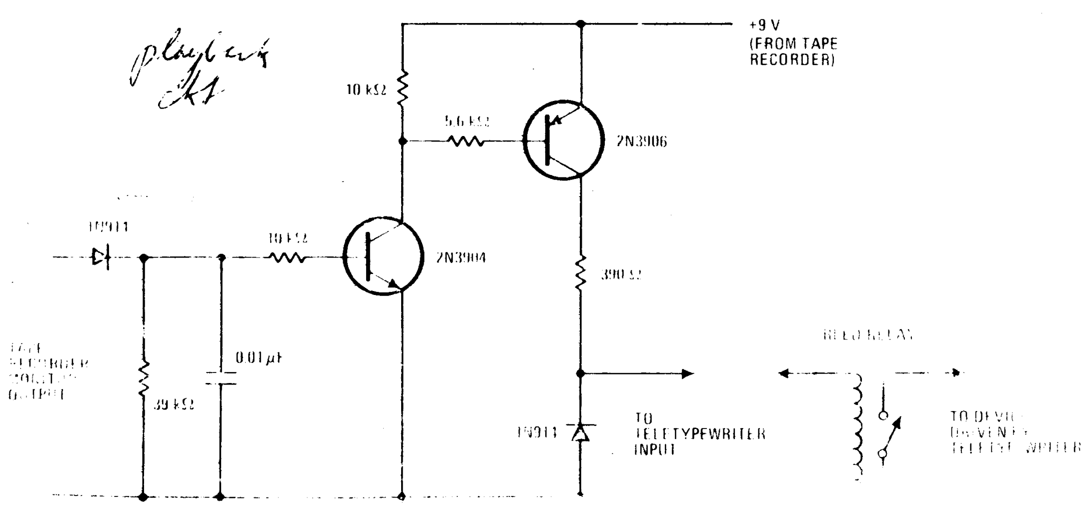
The recorder-to-teletypewriter interface circuit (b) detects the recorder's output, and then rectifies and filters it so that a positive voltage is developed whenever a tone is present. A bleeder resistor is placed across the recorder output lines to produce the proper decay when the tone is removed. This decay voltage is then used to turn on a two-transistor driver that operates the teletypewriter. The output of this detector circuit can also be used to drive a reed relay to produce switch closures like those of a standard teletypewriter output.

It should also be noted that both interface circuits run off of a 9-volt supply, which can often be taken from the recorder's battery pack. □

recording A1



playback A1



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Simple f.m. modulator/ demodulator for a magnetic tape recorder

by B. D. Jordan
Institute for Advanced Studies, Dublin

This unit offers an extension of the facilities of a domestic tape recorder to permit its use as an intrumentation recorder employing f.m. principles. The design involves no modification of the tape recorder and thus allows a wide field of application with various makes and types of machines.

Magnetic tape as a medium for recording v.l.f. signals or signal levels, suffers at least two serious limitations when using direct recording methods. First, the frequency response rarely extends below about 50Hz and, second, amplitude instability occurs, caused mainly by surface inhomogenieties in the tape. For the purposes of handling analogue data, where the d.c. component of the signal must be preserved, it is necessary to incorporate some form of signal modulation into the recording process. Most of the commercially available instrumentation tape recorders employ f.m. modulation and many of these have specifications that include a frequency response of d.c. to 2MHz as well as a great many other facilities that may not be required.

The instrument described was designed to provide a tape recorder with f.m. modulation giving a frequency response of d.c.–800Hz for recording v.l.f. phenomena and utilizing a domestic recorder at a tape speed of 9.1cm/sec. At this tape speed the tape recorder has a frequency response of about 50Hz–6.0kHz. The carrier frequency was chosen to lie in the midband region, i.e. 3kHz so that amplitude variations in the tape recorder output would not be excessive within the expected range of frequencies to be handled. In order to minimize the effect of wow and flutter due to the transport system, a reasonably large depth of modulation is desirable. A frequency deviation of about $\pm 30\%$ of the carrier was found to be satisfactory.

An integrated phase locked loop, Signetics type NE565, was used as both modulator and demodulator. Fig. 1 illustrates the principle of the phase locked loop. An f.m. signal, f_s, is fed to a phase comparator whose reference is the output of a voltage controlled oscillator, f_o. The phase comparator is a balanced multiplier which produces the sum, (f_s+f_o) and difference (f_s-f_o) frequencies of the input f.m. signal and the voltage controlled oscillator output. When the loop is in lock, the v.c.o. duplicates the input frequencies so that $f_s - f_o = 0$, and the output of the phase comparator contains a d.c. component which is proportional to the phase difference between the input signal and the v.c.o. output. A low pass filter removes the sum frequency component and the remaining d.c. voltage is amplified and used to control the v.c.o. frequency in such a manner as to maintain $f_s = f_o$. It is this controlling or error voltage which constitutes the demodulated signal.

The modulator

One of the outstanding features of the NE 565 is the high linearity and wide dynamic range of the v.c.o. These characteristics make the device particularly attractive as a modulator. For this purpose the loop can be opened by disconnecting the v.c.o. output from the phase comparator reference input. The modulating signal can then be applied directly to the v.c.o. input, or if required, advantage can be taken of the high gain d.c. amplifier, by applying the modulating signal to the signal input of the phase comparator. The reference input should be returned to earth in this mode of operation. The low pass filter can be omitted by disconnecting C_2.

The Fig. 2 shows the complete circuit. The v.c.o. is a relaxation type of oscillator the free running frequency, f_o being determined by the external capacitor, C_1, and the charging current controlled by R_1. The frequency f_o can be calculated from the expression

$$\frac{1}{4R_1C_1}$$

C_1 can be any value, but R_1 has an optimum value of about 4kΩ so as to maintain minimum linearity error. So for our system, with f_o = 3kHz, C_1 = .021μF. The conversion factor K for the v.c.o. is given by

$$K = \frac{50f_o}{V_{cc}} \text{ radians/sec/volt}$$

In our case f_o = 3kHz and V_{cc} = 6V. K = 2kHz per volt. Therefore in order to limit the depth of modulation to $\pm 30\%$ (±900Hz maximum frequency deviation), the control voltage at the v.c.o. input must not exceed 0.9V peak to peak. The gain of the d.c. amplifier can be varied by means of the feedback resistor R_2. Thus the depth of modulation can be fixed for a given input by means of R_2.

Demodulator

In this mode of operation the phase locked loop is closed by reconnecting the v.c.o. output to the phase comparator reference input. The low pass filter is formed by connecting C_2 between pin 7 and the power rail.

The capture range, f_c of the p.l.l. (i.e. that range of frequencies about f_o over which the loop can acquire lock) is given by

$$f_c = \frac{1}{\pi}\sqrt{\frac{32\pi f_o}{\tau V_{cc}}}$$

τ is the time constant of the l.p. filter formed by C_2 and an internal resistance of 3.6kΩ. The tracking range f_t of the p.l.l. is that range of frequencies about f_o over which the v.c.o. once having acquired lock, will maintain lock with the input signal and is given by

$$f_t = \frac{8f_o}{V_{cc}}$$

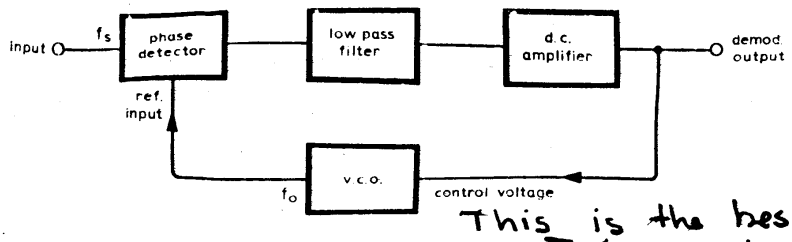

Fig. 1. Block diagram of the phase lock loop.

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This is the best copy I can make. Look it up in the Library if you are interested in it.

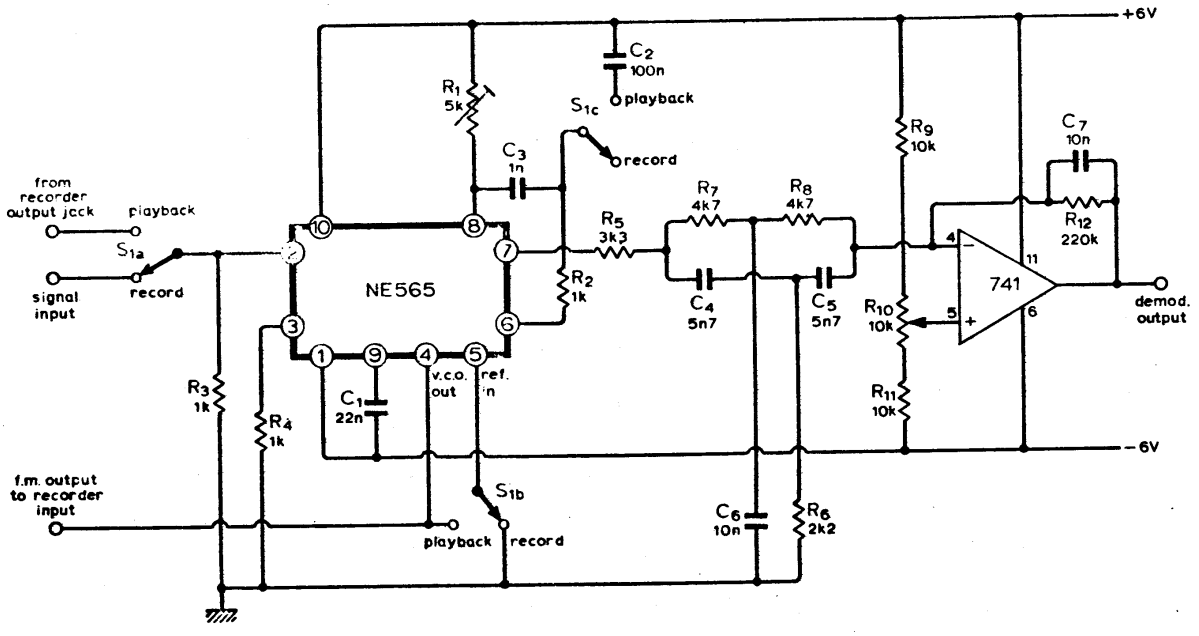


Fig. 2. The complete modulator/demodulator circuit.

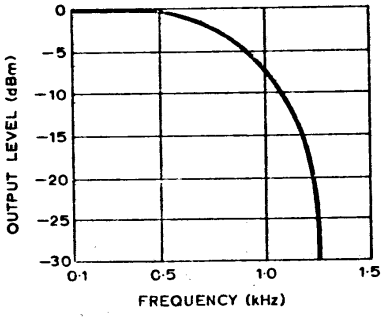


Fig. 3. The system frequency response.

To eliminate the residual unwanted sum frequency component present in the demodulated output, a balanced *T* filter is incorporated in the output. This was found to be most effective when tuned to $2f_o$. This is followed by a low pass active filter which has a cut-off frequency at 800Hz. Because the demodulator of the p.l.l. output is referenced to the positive power rail there is always a standing d.c. potential of about 0.125 V_{cc} below the positive power rail. This can be cancelled out by means of the level shifting facility incorporated in the active filter.

Performance and testing

The system was tested using an Akai Model XV tape-recorder at a tape speed of 9.1cm/sec and a carrier frequency of 3kHz. Fig. 3 shows the frequency response of the system. This test was made by recording an f.m. signal produced by applying tones of 5mV peak to peak from 1.0Hz to 1.5kHz to the input. This recording was then played back and the demodulated signals were measured with an oscilloscope. A d.c. test was made by applying d.c. levels from −5mV to +5mV to the input. On playback the linearity error of the reproduced levels was less than 0.5%.

A two-channel system was constructed on a printed circuit board and mounted together with power supply in an instrument case measuring 10×7×6in. No special layout precautions were found to be necessary. The system was incorporated in a 2-channel d.c. photometer.

TITUS LABS
P. O. BOX 242
BLACKSBURG, VA. 24060

TECHNICAL REPORT # 67

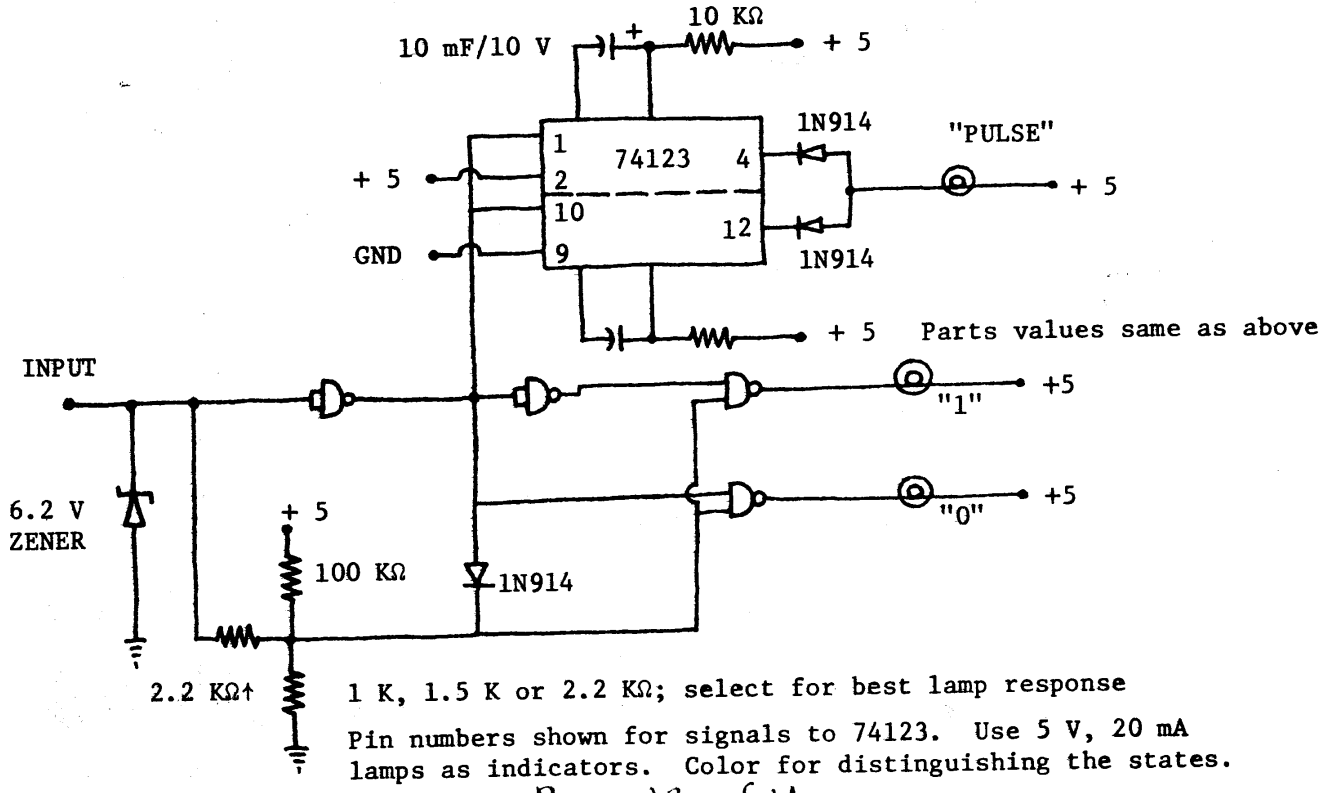
LOGIC PROBE

This is an extremely simple probe which will detect extremely short pulses, logic levels, and open circuits for standard TTL and DTL circuits.

The first two NAND gates, A and B, buffer the input signal and then drive the following two NAND gates which then indicate the logic level present by lighting the correct output lamp. The first input NAND gate also drives two monostable circuits (74123), one of which is set to trigger on a positive-going edge and the other is set to trigger on a negative-going edge. The Q outputs of the monostables are ANDed with two diodes which are then connected to a lamp. When either of the Q outputs go to 0, indicating that the monostable has been triggered, the lamp lights indicating a logic level transition.

The resistor and diode input network will disable the lamp driver NAND gates when no definite input is present at the probe tip. When all the lamps are off it indicates an open circuit at the probe. This makes the probe very useful for detecting open input pins on integrated circuit packages. Open output pins will give a definite logic level. The red and the clear lamps indicate the logic level present at the input. The flashing of the green lamp will indicate a logic level transition. The monostables are now set for about a 10 to 25 millisecond pulse.

LOGIC PROBE



1 K, 1.5 K or 2.2 KΩ; select for best lamp response

Pin numbers shown for signals to 74123. Use 5 V, 20 mA lamps as indicators. Color for distinguishing the states.

TECHNICAL REPORT # 68

TITUS LABS
P. O. BOX 242
BLACKSBURG, VA. 24060

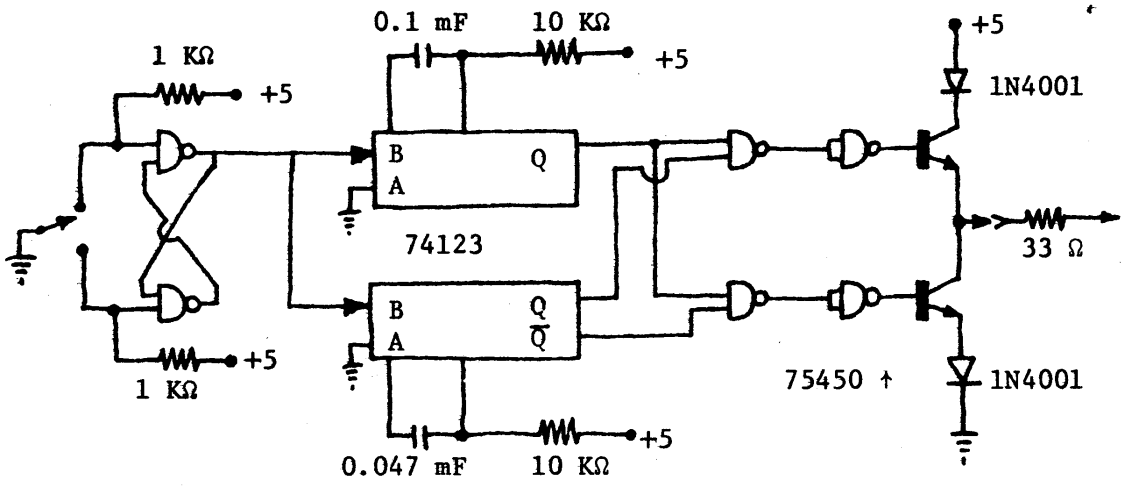
LOGIC PULSER PROBE

The Logic Pulser Probe shown in the schematic is an extremely useful tool for anyone testing and designing digital logic circuits. It will provide both a logic 1 and a logic 0 pulse to DTL and TTL type circuits from a normally high impedance state. It is no longer necessary to determine what type of a pulse is needed at a circuit node since the probe will provide a pulse of the opposite logic level. Most probes do not have this feature.

The bounceless switch configuration triggers both of the monostables (74123), but the period of monostable A is twice as long as that of monostable B. A enables the NAND gate and B then strobes each, which then turn on the output transistors in sequence. This causes the probe to go from the normal high impedance or off state to a logic 1 followed by a logic 0 and finally a return to the off state. The off state does not affect the logic circuits under test.

Pulse widths are easily changed by changing the values of the resistor-capacitor network for each monostable. It is best to keep the pulses short and the period of A should be twice that of B to give equal times to both logic level pulses. The 33 ohm resistor may be added for current limiting if needed and the complete circuit may be constructed to fit into a small pocket-sized flashlight case.

LOGIC PULSER PROBE



MICRO-8 NEWSLETTER 7 DECEMBER 74 VOL. 1, NO. 4
HAL SINGER - EDITOR
CABRILLO COMPUTER CENTER, 4350 CONSTELLATION
LOMPOC, CA 93436

SORRY ABOUT THE DELAY BETWEEN THE LAST TWO ISSUES. I HAVE HAD MANY COMMITMENTS THE LAST TWO MONTHS PLUS A SERIOUS ILLNESS IN THE FAMILY. OTHERWISE ANOTHER ISSUE WOULD HAVE BEEN OUT WEEKS AGO.

IT CERTAINLY ISN'T BECAUSE PEOPLE HAVEN'T BEEN SENDING IN MATERIAL. THERE IS MORE MATERIAL THAN I COULD POSSIBLY CONDENSE INTO THIS ISSUE. HOPE EVERYONE CONTINUES TO SEND IN MATERIAL. WE ESPECIALLY NEED FIRM PROPOSALS FOR STANDARDIZING I/O AND FORMATS FOR CASSETTE TAPE, PAPER TAPE DEVICE INTERFACES, ETC.

I MUST ALSO APOLOGIZE ABOUT THE PRINTING QUALITY. SEVERAL THINGS HAVE COMBINED TO MAKE THE PRESENT FORMAT NECESSARY, ONLY ONE OF WHICH IS COST. I HAD NOT ANTICIPATED 270 MEMBERS. EVERY ISSUE I HAVE HAD TO MAKE THE DECISION WHETHER TO SPEND SEVERAL ADDITIONAL WEEKS TRYING TO PREPARE AND PRINT COPY OR GET WHAT IS AVAILABLE OUT TO YOU. GETTING BUG REPORTS AND NAMES AND ADDRESSES TO YOU IN A HURRY HAS SEEMED MOST IMPORTANT. I HOPE YOU HAVE BEEN CONTACTING OTHER BUILDERS IN YOUR AREA AND CORRESPONDING WITH THE ONES OUTSIDE OF YOUR AREA.

POPULAR ELECTRONIC'S PUBLICATION OF THE 8080 MICROCOMPUTER ARTICLE IN THE JAN 75 ISSUE WILL PROBABLY MAKE EVERYONE WONDER IF HE DID THE RIGHT THING IN STARTING THE MARK-8. THE KIT PRICES ARE NEARLY UNBELIEVABLE. HOWEVER IT IS STILL ABOUT TWICE THE COST OF A MARK-8 WHICH PUTS IT OUT OF THE PRICE RANGE OF MOST EXPERIMENTERS ESPECIALLY IF THEY PUT ENOUGH MEMORY ON IT TO BE ABLE TO RUN ANY DECENT SOFTWARE.

A QUESTION FOR THE MARK-8 USER GROUP PARTICIPANTS IS HOW DO WE FIT INTO THE BIG PICTURE? CERTAINLY WE NEED TO SET UP I/O STANDARDS SO THAT DEVICES CAN INTERFACE TO EITHER COMPUTER. WILL A SEPERATE GROUP FORM AROUND THAT CONFIGURATION OR DO WE STAY TOGETHER? SURE IS HARD KEEPING UP WITH ELECTRONICS NOW DAYS -- BUT IT IS SURE FUN TRYING TO.

WHAT KIND OF FUTURE DO YOU WANT FOR THE USER GROUP?

A DECISION HAS TO BE MADE BY MARK-8 USERS AS TO WHAT IS TO HAPPEN IN THE FUTURE. IN OFFERING THE NEWSLETTER SERVICE THRU THE SASE ROUTE MY OBJECTIVES WERE:

1) PROVIDE A NON-COMMERCIAL LOW COST MEANS FOR BUILDERS TO RECEIVE PROMPT BUG REPORTS AND SOURCES FOR PARTS.
2) TO ALLOW BUILDERS TO GET TOGETHER AND HELP EACH OTHER WITH PROBLEMS.
3) INVOLVE MYSELF IN THE ACTION SO I KNOW WHAT IS GOING ON.

THESE OBJECTIVES HAVE BEEN MET QUITE SATISFACTORILY. SEVERAL PARTICIPANTS HAVE MENTIONED THAT THE BUG REPORTS HAVE ALLOWED THEM TO GET THEIR SYSTEMS RUNNING WITH MINIMAL PROBLEMS. WE NOW HAVE A WIDE RANGE OF PARTS SUPPLIERS SUPPLYING COMPONENTS AT VERY ATTRACTIVE PRICES. PARTICIPANTS HAVE BEEN CONTACTING OTHERS AND GETTING TOGETHER ON MUTUAL PROBLEMS. I HAVE CERTAINLY BEEN KEPT INVOLVED IN THE ACTION. FOR THE FUTURE, THESE COMMENTS:

1) IT SEEMS ESSENTIAL TO MAKE SOME REASONABLE CHARGE FOR MEMBERSHIP SO THAT PRINTING CAN BE IMPROVED AND THE NL'S CAN BE SENT BULK MAIL.

2) AS MUCH AS I ENJOY DOING THE NEWSLETTER, IT ABSORBS AN ENORMOUS AMOUNT OF TIME. THUS IT SEEMS NECESSARY TO SET UP A WAY OF SHARING THE EDITORSHIP WITH OTHER PARTICIPANTS. THE CABRILLO COMPUTER CENTER CAN STILL SERVE AS A CLEARING HOUSE FOR INCOMING MAIL AND A DISTRIBUTION POINT FOR OUTGOING NL'S. INFORMATION SENT IN BY PARTICIPANTS CAN BE FORWARDED TO THE CURRENT EDITOR FOR THE UPCOMING ISSUE.
3) IT MAY BE DESIRABLE TO HAVE TWO RELATIVELY INDEPENDENT NEWSLETTERS OR AT LEAST SEPERATE EDITORS FOR A HARDWARE SECTION AND A SOFTWARE SECTION. STEVE DIAMOND, 311 CARL ST., SAN FRANCISCO, CA 94117 HAS EXPRESSED AN INTEREST IN ORGANIZING THE SOFTWARE END.

PLEASE JOT DOWN YOUR DESIRES AND SUGGESTIONS AS TO WHAT YOU WANT TO SEE HAPPEN IN THE FUTURE. I'LL TRY TO SUMMARIZE THEM IN NL #5 AND PUBLISH A DECISION AS TO WHAT WILL HAPPEN IN THE FUTURE. AS ONE READER POINTED OUT, "THIS THING IS THE TIP OF AN ICEBURG." I WONDER WHAT'S REALLY UNDERNEATH?

BUGS

ROBERT COOK PROVIDED US WITH AN UP-TO-DATE LIST OF BUGS. HIS MARK-8 IS RUNNING SO IT SHOULD BE ACCURATE AND COMPLETE. THERE ARE A FEW OTHER THINGS MENTIONED BY OTHER USERS THAT HAVE BEEN ADDED.

1. P. 6, PARAGRAPH 4, LAST LINE: CHANGE TO "RESISTORS R1-R4 AND R21."
2. CONNECTIONS ON THE BOTTOM OF THE BOARDS ARE IN PARALLEL. ARRANGE THE BOARDS IN ORDER SHOWN IN THE BOOK AND WIRE, THEN CUT OUT WIRES 9 THRU 16 BETWEEN INPUT MULTIPLEXER AND ADDR/MANUAL BOARDS.
3. P. 4, INPUT MULTIPLEXER PARTS LIST SHOULD READ: "C1, C3, C4 - 0.1 MF DISK, C2 - 100 MF 10 V. ELECTROLYTIC."
4. THE 8 HOLES AT THE TOP OF THE MEMORY BOARD WHERE THE OUTPUT LEADS CROSS THE GROUND LEAD SHOULD NOT!!! BE CONNECTED THRU THE BOARD.
5. INSTALL A JUMPER ON INPUT MULTIPLEXER BOARD BETWEEN IC3 PIN 14 AND +5 VOLTS.
6. ON LED BOARD, C2 GOES FROM B+ TO B+ AND SHOULD GO FROM B+ TO GROUND.
7. ON ADDRESS LATCH BOARD THERE SHOULD BE A JUMPER FROM IC1, PIN 5, TO IC2 PIN 1.
8. IC3 ON CPU BOARD HAS NO GROUND. CONNECT INSULATED WIRE FROM PIN 4 TO GROUND RAIL AND CHECK FOR CHANGE OF STATE OUTPUT ON PINS 10 AND 11. (THIS MAY APPLY ONLY TO SOME BOARD SETS.)

NOTE:

IN CONNECTING THE 41 WIRE BUS FROM BOARD TO BOARD, NOTICE THAT THE TWO SETS OF HOLES ARE NOT ALL CONNECTED AND THOSE THAT ARE CONNECTED ARE ONLY ON ONE SIDE. CHECK EACH CONNECTION TO BE SURE YOU HAVE A COMPLETE CIRCUIT.

ALL OF THE OPERATIONS INVOLVED IN MANUALLY LOADING AND READING MEMORY ARE INDEPENDENT OF THE 8008. IN ORDER TO MINIMIZE DANGER OF DAMAGE TO THE 8008, CHECK OUT ALL OF THIS CIRCUITRY BEFORE INSERTING THE 8008.

YOU MAY HAVE TO DECOUPLE THE CRYSTAL CLOCK, OTHERWISE IT MAY RUN AT 10 MHZ. R3 MAY BE TOO SMALL. (PLESKAC)

THOUGH NOT AN ERROR, IT MIGHT BE WELL TO REMIND PEOPLE TO INSTALL FRONT-TO-BACK JUMPERS ON THE MEMORY BOARD WHEN NOT USING THE "B JUMPERS 1ST BOARD ONLY. (WILLIAM SEVERENCE)

A PICTURE IN THE MANUAL SHOWS TRIMPOTS. THIS MUST BE THE FIRST PROTOTYPE THAT USED A MULTIVIBRATOR CLOCK INSTEAD OF THE CRYSTAL CLOCK.

FUTURE MAGAZINE ARTICLES - IT IS VERY HARD TO SECOND GUESS THIS ONE. THE NEXT RE WILL HAVE A WRITEUP ON SOUTHWEST TECH. PROD. VIDEO TERMINALS, PROBABLY SMITH'S TVT MODEM ARTICLE WILL APPEAR IN THE NEXT ISSUE AND MR. TITUS STILL IS WORKING ON HIS CALCULATOR INTERFACE. MR. TITUS HAD HIS INPUT BUS EXPANSION SCHEME PUBLISHED IN THE DECEMBER ISSUE. WHY DOSEN'T SOMEONE DESIGN A MEMORY BOARD EXPANSION USING 4K DYNAMIC RAMS'S AND GET IT INTO RE? I NOTICE INTERNATIONAL ELECTRONICS UNLIMITED IS ADVERTISING A 16 BIT COMPUTER KIT. THEY SURE ARE VAGUE ABOUT IT.

COMPUTER HOBBYIST - STEVEN STALLINGS, HAL CHAMBERLIN & RICHARD SMITH PUBLISHED THEIR TRIAL ISSUE OF THE "COMPUTER HOBBYIST" AND IT'S GOOD. THE 1ST ISSUE CONTAINS PART 1 OF A WRITEUP ON AN 8008 GRAPHICS DISPLAY, A SURPLUS SUMMARY INCLUDING A RUNDOWN ON ALL THE TELETYPES AND WHAT THEY SHOULD COST, AND NOTES ON THE INSTRUCTION SET OF THE 8008. IT LOOKS LIKE THESE GUYS HAVE THINGS TO SAY AND IF THEY HAVE ENOUGH RESPONSE THEY WILL PUBLISH MONTHLY FOR 50 CENTS AN ISSUE. WRITE TO THEM AT THE COMPUTER HOBBYIST, BOX 295, CARY, NC 27511.

YOU MAY WANT TO CONTACT STEPHEN B. GRAY, AMATEUR COMPUTER SOCIETY, 260 NORTON AVE., DARIEN, CN 06820. I DON'T KNOW WHAT HE IS UP TO YET BUT HOPE TO FIND OUT SOON.

TOOLS YOU MUST HAVE - IF YOU HAVEN'T ORDERED A "SOLDAPULLT" FROM EDSYN YET, DO IT! THEIR BEST COSTS $9.95 AND YOU SHOULD ORDER A FEW EXTRA TIPS @ $1.50. IF YOU HAVEN'T USED ONE, I GUARANTEE THAT IT WILL BE ONE OF YOUR MOST PRIZED TOOLS IN JUST A FEW DAYS. IT MAKES IC REMOVING A CINCH. WRITE TO: EDSYN, 15954 ARMINTA ST., VAN NUYS, CA 91406

BOOKS YOU NEED - MOST EVERYONE HAS OBTAINED THE INTEL 8008 USER MANUAL. ANOTHER ONE WORTH GETTING IS THE MICROSYSTEMS INTERNATIONAL MF8008 APPLICATIONS MANUAL, BULLETIN 80007. IT CONTAINS THE INFORMATION IN INTEL'S BOOK AND ALSO INCLUDES CIRCUITS, PC BOARD DRAWINGS AND CIRCUIT DESCRIPTIONS FOR A MODULAR MICROCOMPUTER USING THE MF8008. ALSO INCLUDED IS A USER'S GUIDE AND LISTING FOR MONITOR 8, AN EDITOR, SYMBOLIC ASSEMBLER, AND DEBUGGING SYSTEM WITH THE ABILITY TO LOAD AND DUMP PROGRAMS IN SEVERAL FORMATS AS WELL AS SET AND CLEAR BREAKPOINTS. WRITE TO MICROSYSTEMS INTERNATIONAL, 450 SAN ANTONIO ROAD, PALO ALTO, CA.

THE SCELBI USER MANUAL IS VERY WELL PREPARED INTRODUCTION TO ASSEMBLY LANGUAGE PROGRAMMING FOR THE 8008 AND IS WELL WORTH THE COST OF $10. ORDER FROM SCELBI COMPUTER CONSULTING, INC., 1322 REAR, BOSTON POST ROAD, MILFORD, CN 06460.

SEVERAL PARTICIPANTS HAVE WARNED OTHERS TO SAVE THEIR MONEY ON THE RGS USER MANUAL. IT MAY BE OF VALUE SOMEDAY WHEN THEY COMPLETE IT BUT IS ONLY WORTH A SMALL FRACTION OF THE $25 THEY ARE CHARGING FOR IT NOW.

NO ONE HAS RECEIVED THE MARTIN RESEARCH BOOK YET AS FAR AS I KNOW. IT SHOULD BE VALUABLE AND I HOPE WE CAN GET PEOPLE TO PASS IT AROUND. THEIR ADDRESS IS MARTIN RESEARCH, LTD., 1825 S. HALSTED, CHICAGO, IL 60608.

WRITE FOR THE SEMTRONICS PC BOARD CATALOG. ENCLOSE AN SASE AND YOU WILL RECEIVE A LISTING OF ALL THE PC BOARDS AVAILABLE FOR MOST OF THE MAGAZINE ARTICLES YOU'VE SEEN AND BEEN INTERESTED IN FOR THE LAST FEW YEARS. HE HAS TVT AND MARK-8 BOARDS. PERHAPS YOU CAN GET HIM TO SUPPLY THE MARK-8 BOARDS REVERSED (I.E., TOP PATTERN ON BOTTOM AND BOTTOM ON TOP). WRITE TO SEMTRONICS, RT. 3 BOX 1, BELLAIRE, OHIO 43906. HE ALSO DOES CUSTOM ETCHING.

A LOT OF PEOPLE STILL HAVEN'T FIGURED OUT HOW TO GET DATA SHEETS ON IC DEVICES. WRITE TO THE FOLLOWING COMPANIES AND ASK FOR THE FOLLOWING BOOKS. IT WON'T HURT TO LIE A LITTLE ON YOUR ADDRESS OR HAVE IT SENT TO YOUR COMPANY. (I.E. BROWN'S COMPUTER CONSULTING SERVICE, ETC.)

NATIONAL SEMICONDUCTOR CORPORATION, DATA LIBRARIAN, 2900 SEMICONDUCTOR DRIVE, SANTA CLARA, CA 95051 ASK FOR:
A) DIGITAL INTEGRATED CIRCUITS MANUAL
B) MOS INTEGRATED CIRCUITS MANUAL
C) LINEAR INTEGRATED CIRCUITS MANUAL
D) INTERFACE INTEGRATED CIRCUITS MANUAL
E) TRANSISTORS MANUAL F) LINEAR APPLICATIONS (COSTS $2.50)
G) O.E.M. PRICE SCHEDULE
FAIRCHILD SEMICONDUCTOR CORP. 464 ELLIS ST., MOUNTAIN VIEW, CA 94040
A) TTL DATA BOOK B) LINEAR INTEGRATED CIRCUITS DATA CATALOG
C) LINEAR IC APPLICATIONS HANDBOOK D) O.E.M. PRICE SCHEDULE
SIGNETICS, PO BOX 3004, MENLO PARK, CA 94025 ASK FOR:
A) LINEAR IC DATA BOOK B) 8000 SERIES TTL DATA BOOK
C) 7400 SERIES TTL DATA BOOK D) MOS SERIES DATA BOOK
E) O.E.M. PRICE SCHEDULE
MOTOROLA SEMICONDUCTOR, 5005 E. MCDOWELL RD., PHOENIX, AZ 85008
A) MOTOROLA SEMICONDUCTORS PRICE LIST
WEATHERFORD, 6921 SAN FERNANDO RD., GLENDALE, CA 91201
A) DESIGNING WITH TTL PROM'S AND ROM'S
SEND DETAILED ORDER INFORMATION FOR OTHERS YOU HAVE THAT YOU HAVE FOUND USEFUL.

INFO FROM AND ABOUT SUPPLIERS - NOTE: ANYTHING YOU READ HERE IS SIMPLY INFO OBTAINED FROM PARTICIPANTS OR SUPPLIERS AND IT IS UP TO YOU TO VERIFY THE ACCURACY OF THE INFORMATION AND THE INTEGRITY OF THE COMPANIES.

MAURY GOLDBERG, CELETRON COMMUNICATIONS CORP., 1618 JAMES ST., SYRACUSE, NY 13203. SOME OF YOU RECEIVED A FLYER FROM MAURY. IT FEATURED 2102-S-2 MIL SPEC AT $9.99 EA, 8 FOR $75, 32 FOR $280. HE IS WORKING WITH TECHNIQUES TO PROVIDE A 4K BOARD. HE ALSO HAS THE COM 2502 UART FOR $9.95 AND WILL SUPPLY A DIAGRAM FOR A TTY INTERFACE FOR THE MARK-8. HE IS WILLING TO PUT TOGETHER AN IC KIT FOR THE MARK-8 IF THERE ARE ENOUGH PEOPLE INTERESTED.

KA ELECTRONIC SALES, 1220 MAJESTY DRIVE, DALLAS, TX 75247 WILL SUPPLY THE MF8008 (MICROSYSTEMS INTERNATIONAL 8008 - WORD IS THE MF8008 USUALLY RUNS MUCH FASTER THAN THE INTEL) FOR $66.

DUE TO AN UNFORTUNATE COMBINATION OF TIMING AND LOCATION, M&R ENTERPRISES PO BOX 1011, SUNNYVALE CA 94088 WAS INDIRECTLY CONNECTED WITH ELECTRONIC COMPONENT SALES. THERE IS NO CONNECTION WHAT-SO-EVER. I MUST APOLOGIZE TO MARTIN J. SPERGEL FOR IMPLYING THAT THERE MIGHT BE SOME CONNECTION. HE HAS TALKED TO ME SEVERAL TIMES AND HAS SOME COLOSSEL BUYS FOR MARK-8 BUILDERS AND CAN COME UP WITH MORE IN THE FUTURE. IF YOU ARE STILL SUSPICIOUS, HE SUGGESTS THAT YOU CONTACT HIM FOR A BANK REFERENCE. HIS COLOSSAL BUY IS THE MF8008 FOR $60 OR A PARTIAL KIT INCLUDING THE MF8008, 15 7400'S, AND ALL OF THE RESISTORS AND THE .1 CAPACITORS FOR THE MARK-8 FOR $75. HE WILL SUPPLY A COMPLETE KIT OF PARTS FOR ROGER SMITH'S TTY AND CASSETTE TAPE INTERFACE FOR THE TVT FOR UNDER $35 MINUS THE SWITCH AND PC BOARD. HE SUGGESTS THAT THOSE INTERESTED IN BUILDING IT SEND AWAY TO TECHNIQUES QUICKLY FOR THE PC BOARD OR IT WILL BE A LONG WAIT. HE HAS 100 KITS OF PARTS AVAILABLE AND IT WILL BE AFTER THE FIRST OF THE YEAR BEFORE HE WILL HAVE MORE. ALSO SEE HIS FLYER IN THE BACK OF THE NEWSLETTER FOR TVT IC'S. HE HAS 2102'S FOR $10 AND MOLEX SOCKETS. WOULD YOU LIKE A 150 MHZ TEK SCOPE FOR AROUND $650 OR A TV CAMERA AND RECORDER VERY CHEAP? WRITE MARTIN AND SEE HOW HE IS DOING ON ACQUISITION. WRITE HIM IF YOUR INTERESTED IN A MIDI KIT INCLUDING MF8008, ALL 74-- IC'S, RESISTORS, .1 CAPS, & 8 PRIME QUALITY 1101'S. THE MIDI KIT COULD BE AROUND $125 IF ENOUGH PEOPLE ARE INTERESTED.
HE HAS 1702A PROMS FOR $40.

A FLYER WAS SUPPLIED BY MNH-APPLIED ELECTRONICS. ADAM TRENT HAS DONE BUSINESS WITH HIM AND WAS VERY PLEASED WITH SOME ITEMS BUT WARNED THAT A TTL REJECT ASSORTMENT CONTAINED NO GOOD DEVICES. CHECK WITH DR. MICHAEL N. HAYES, THE OWNER REGARDING WHAT YOU CAN EXPECT AND ASK HIM TO SUPPLY ALL OF HIS BACK CATALOGS AT THE SAME TIME.

SOME OF THE OLD STANDBY SUPPLIERS THAT PARTICIPANTS KEEP MENTIONING ARE INTERNATIONAL ELECTRONICS UNLIMITED, POLY PACS, BILL GODBOUT, JAMES, BABYLON, SOLID STATE SALES. SOME OF THE INFO IS A LITTLE CONTRADICTORY BUT THEY ALL ARE RELIABLE AND YOU CAN EXPECT SOMEWHERE AROUND 5% FAILURES. THAT MAY NOT BE SO BAD ANYWAY BECAUSE NEW DEVICES JUST MIGHT CONTAIN THE SAME PERCENTAGE OF BAD ONES. IN ANY CASE, KEEP TRACK OF THE COMPANY YOU BOUGHT THE IC'S FROM AND TRY TO CHECK THEM BEFORE YOU SOLDER THEM IN AND MAKE THEM SEND YOU AN EXCHANGE ON THE BAD ONES. A HIGH PRIORITY INTERFACE UNIT FOR THE MARK-8 WILL BE A UNIVERSAL IC TESTER. THIS, TEAMED WITH A MINI ENVIRONMENTAL UNIT, SHOULD MAKE SURPLUS IC CHECKING A SNAP.

MANY OF YOU HAVE ALREADY HEARD THE UGLY STORY ABOUT ELECTRONIC COMPONENT SALES. A LARGE ARTICLE APPEARED IN OCT 14, 1974 ELECTRONIC NEWS. RUMOR HAS IT THAT A STANFORD STUDENT WITH 12 ALIASES PLACED THAT AD AND HAS ACCUMULATED MORE THE $400,000 IN SMALL ORDERS, MANY FROM LARGE FIRMS. THE POST OFFICE AND FBI ARE AFTER HIM. I HAVE HEARD SEVERAL REPORTS THAT HE HAS STARTED TO DELIVER AND OR REFUND MONEY BUT THIS MAY REALLY BE BAD NEWS. IF HE DELIVERS ANYTHING, HE CAN SIT ON THE OTHER ORDERS SINCE HE DIDN'T SAY WHEN HE WOULD DELIVER. IF HE GOT TO YOU, SEND A LETTER ASKING FOR IMMEDIATE DELIVERY OR REFUND. YOU MAY BE ABLE TO SALVAGE YOUR MONEY. IT SURE MAKES ONE REALIZE HOW VULNERABLE HE IS WHEN HE SENDS HIS CASH AWAY. BETTER STICK WITH WELL RECOMMENDED SUPPLIERS UNTIL YOU CHECK THESE OTHER GUYS OUT CAREFULLY.

PEOPLE'S COMPUTER COMPANY - BOB ALBRECHT HAS ALWAYS HAD ABOUT A 5 YEAR VISIONARY JUMP ON EVERYONE ELSE REGARDING THE COMPUTER FIELD. HE WAS INTO EDUCATIONAL COMPUTING BEFORE SCHOOL'S THOUGHT THEY COULD AFFORD A COMPUTER. HE HAS BEEN BRINGING RECREATIONAL AND EDUCATIONAL COMPUTING TO THE PEOPLE FOR THE LAST THREE YEARS THRU HIS PEOPLE'S COMPUTER COMPANY. (PCC) THE BEST WAY TO FIND OUT WHAT THEY ARE DOING IS TO SUBSCRIBE TO THE PCC NEWSPAPER, 11" X 17", AT LEAST 24 PAGES AND FILLED WITH EXCITING AND ENTERTAINING INFO. BOB HAS AGREED TO MAKE THE MARK-8 USERS AN OFFER THEY JUST CAN'T REFUSE. TELL HIM YOU READ ABOUT IT IN THE NEWSLETTER AND YOU CAN GET A REGULAR $5 YEARLY SUBSCRIPTION (STARTS WITH SEPT 74 ISSUE) OR A RENWAL FOR ONLY $3. (5 OR MORE ISSUES A YEAR.) IT'S THE BEST $3 YOU CAN SPEND. I RECOMMEND THAT YOU GET THE 9 BACK ISSUES FOR $6. BOB SAYS THE $3 DEAL EXPIRES JAN 1, 75. HE THINKS MICRO-COMPUTERS ARE THE WAVE OF THE FUTURE AND IS NEGOTIATING A DEAL WITH INTEL TO GET SOME 8080 AND 8008 SYSTEMS AND HOPES TO WRITE SOME ASSEMBLY LANGUAGE BOOKS. IF THEY ARE ANYWHERE AS GOOD AS HIS BASIC LANGUAGE BOOKS THEY WILL BECOME CLASSICS.

A SOLUTION TO THE MEMORY BOARD IC SOCKET PROBLEM - ADAM TRENT SUGGESTS USING AUGAT SOCKET PINS FOR THE MEMORY BOARD. (I TRIED IT AND IT WORKS GREAT! SEE MNH FLYER IN BACK FOR SURPLUS AUGAT BOARDS. I USED A DIAGONAL PLIERS TO LIFT THE PINS OUT OF THE MOUNTING BOARD. YOU DON'T EVEN HAVE TO REMOVE THE WIRE WRAP WIRE. LIFT THE PIN, GIVE IT A FEW BACKWARD TWISTS AND OUT IT COMES. THESE CAN BE TAPPED INTO THE MEMORY BOARD HOLES AND EASILY SOLDERED. THIS IS A MUST FOR AT LEAST ONE OF THE 1K MEMORY BOARDS SO YOU CAN GET THE 1101'S CHECKED OUT AND BURNED IN.)

POWER SUPPLIES

1) THE PRECISION SYSTEMS POWER SUPPLY IS GREAT BUT NO CIRCUIT DIAGRAM IS PROVIDED. YOU DON'T REALLY NEED ONE BUT IT WOULD BE NICE TO KNOW WHAT ALL THAT EXTRA GARBAGE IS THERE FOR.
2) CELETRON ELECTRONICS, 1618 JAMES ST., SYRACUSE, NY 13202 WILL SUPPLY A LOW COST KIT DESIGNED BY STEVE CIARCIA.
3) FIGURE A SHOWS CIRCUITS RECOMMENDED BY NATIONAL FOR A 5 VOLT AND -9 VOLT SUPPLY.
4) IF YOUR REGULATOR GOES, SO DO ALL YOUR ICS INCLUDING THE ALL IMPORTANT CPU CHIP. YOU NEED A CROWBAR! (THIS SHORTS OUT THE SUPPLY ON OVERVOLTAGE.) TWO CIRCUITS ARE SHOWN IN FIGURE B.

TERRY RITTER, DANTCO, 2524B GLEN SPRINGS WAY, AUSTIN TX 78741, 512-441-0036 HAS PROVIDED 14 PAGES OF DETAILED INFO. SOME THINGS ARE INCLUDED HERE AND OTHERS WILL HAVE TO WAIT FOR FUTURE NL'S. HE WAS THE FIRST TO SAY HE GOT HIS MARK-8 RUNNING SEVERAL MONTHS AGO. HE IS NOW FRUSTRATED WITH THE "DISAPPEARING DATA" PROPERTY OF SEMICONDUCTOR MEMORY AND IS THINKING ABOUT STANDBY POWER SYSTEMS. 1101'S ARE SUPPOSE TO RETAIN DATA AT -2, +5 VOLTS BUT 30% OF HIS IEU ONES DO NOT. HE PROPOSES THIS TEST FOR "GOOD" 1101'S: STORE DATA, CHECK IT, GO FROM -9 TO -2 V FOR 5 MIN. THEN RETURN TO -9 V AND CHECK FOR STORED DATA ERRORS. HE SPENT 40 HOURS REMOVING BAD IC'S FROM A MEMORY BOARD. HE STRONGLY SUGGESTS MR. TITUS'S "FLATPACK" MOUNTING SCHEME. (THE AUGAT SOCKET PIN TRICK WORKS WELL TO.) HE SUGGESTS USING CIRCUIT STICK ADHESIVE IC PADS ON THE TOP OF THE MEMORY BOARDS IF YOU TRY TO SOLDER IN MOLEX SOCKET PINS. THE OUTER HOLES APPEAR OVER THE PC RUN AND ALLOW CONNECTION TO BE MADE BY SOLDERING THRU THE HOLE TO THE RUN. HE IS SERIOUSLY WORKING ON THE CASSETTE TAPE INTERFACE AND THINKS A GOOD DEAL OF THE WORK CAN BE DONE WITH SOFTWARE RATHER THAN HARDWARE.

M. PAUL FARR, 3723 JACKSTADT, SAN PEDRO, CA 90731 POWERED UP HIS MARK-8 ON 6 NOV. IT RAN PERFECTLY AFTER HE FOUND A SHORT BETWEEN PINS 1 AND 13 OF IC10 ON THE CPU BOARD. (IT APPEARS OBVIOUS THAT WE HAVE FOUND ALL OF THE ERRORS.) PAUL IS A CHEMIST FOR RALSTON PURINA - VAN CAMP DIV. AND HAS HAD ELECTRONICS AS A HOBBY FOR YEARS. HIS MARK-8 CONSISTS OF THE INITIAL 6 BOARDS HE ETCHED HIMSELF AS WELL AS AN EXTRA OUTPUT LATCH AND MEMORY BOARD. HE USED 1101'S FROM IEU WITH APPARENTLY OUTSTANDING SUCCESS. HE ETCHED THE BOARDS WITH EDGE CONNECTORS AND REVERSED THE FOIL PATTERN SIDES ON THE MEMORY BOARDS AND WISHES HE HAD DONE SO ON ALL OF THE REST OF THE BOARDS. HE IS OFFERING THE REVERSE ETCHED MEMORY BOARDS UNDRILLED AND UNTRIMMED FOR $6.00 EA. HE IS OFFERING TO HELP ANYONE IN THE L.A., SAN PEDRO AREA AS A PERSON WHO HAS A MARK-8 RUNNING. HIS UNIT IS BEAUTIFUL AND WELL WORTH GOING OUT OF YOUR WAY TO LOOK AT.

ROBERT COOK, 25W178-39TH ST., NAPERVILLE, IL 60540 GOT HIS MARK-8 RUNING ON 5 OCT. HE USED 1101'S FROM IEU AND HAS FOUND 5 BAD ONES SO FAR. HE IS BUILDING THE MODEM CIRCUIT FROM THE 4/18/74 ELECTRONICS MAG. AND WILL REPORT ON RESULTS.

LARRY PLESKAC, 938 PAULA ST., ESCONDIDO, CA 92027 ALSO GOT HIS MARK-8 RUNNING ON 5 OCT. HE SAYS HE HAD PROBLEMS WITH POLY PAC IC'S AND EXCELLENT LUCK WITH I.E.U. ZERO INSERTION FORCE IC SOCKETS CAN BE PURCHASED FROM TEXTOOL PROD. INC., 1410 PIONEER DR., IRVING, TX 75061, 214-259-2676. ADVANCED MICRO DEVICES AM 2807 IS A DIRECT REPLACEMENT FOR A 2524. HIS CIRCUITS FOR OCTAL READOUT AND STATE DISPLAY ARE INCLUDED IN FIGURE C.

DON GOLENSKIE, BOX A-375, CAMARILLO, CA 93016 SAYS 2107-8 4K RAM'S ARE $12 IN LOTS OF 100. IF WE COULD FIND SOMEONE TO DESIGN A PC BOARD AND REFRESH CLOCKS, ETC, 4K OF MEMORY COULD BE HAD FOR ABOUT $120.

STEVE CIARCIA, 41 HILLTOP DR., WEST HARTFORD, CN 06107 HAS A LOT OF INTERESTING THINGS GOING. HE STOPPED BY SCELBI'S OFFICE AND TOOK A LOOK AT THEIR KITS AND PC BOARDS AND TALKED TO THE MANAGEMENT. HE WAS SO IMPRESSED WITH THEIR DESIGN AND QUALITY THAT HE BOUGHT AN UNPOPULATED BOARD SET FOR $130 AND SHOULD HAVE HIS MACHINE RUNNING NOW. HE ALSO DESIGNED THE SCROLLING MODIFICATIONS TO THE TVT (SCROLLING MEANS ALL LINES POP UP AND THE BOTTOM LINE IS CLEARED OUT WHEN A LINE FEED OCCURS AT THE BOTTOM OF THE SCREEN). THE SCHEMATIC IS SHOWN IN FIG. 8. IT IS SET UP FOR MANUAL SCROLLING NOW BUT IT WOULD BE A TRIVIAL MODIFICATION TO DETECT LINE FEEDS OR CONTROL CHARACTERS AND SCROLL. TRY THE MODS ON YOUR TVT AND SEND IN A FINISHED CIRCUIT THAT DOES IT ALL. THE 10K AND 50K POT ADJUSTMENTS ARE CRITICAL SO MAKE THEM 10 TURN TRIMPOTS. STEVE WRITES, "I'VE FINALLY DEVISED A WAY TO SUCCESSFULLY SCROLL, RESET THE CURSOR, AND PROVIDE AN ERASED LINE WITH ONLY A 4 CHIP ADDITION TO THE BASIC TVT. THE PRESENT SETUP WILL ALLOW SCROLLING UP OR DOWN, RESETTING THE CURSOR TO TOP LEFT OR BOTTOM LEFT, AND WILL ADD A BLANK LINE AT THE BOTTOM. FOUR PC BOARD TAPES WILL HAVE TO BE CUT. IC1 (7408) IS INSERTED BETWEEN IC10 OF THE DERIVED TIMING BOARD AND THE OUTPUT CONNECTOR. IT'S PURPOSE (WITH IC2 & 3) WHEN TRIGGERED BY THE FRAME SYNC AFTER A SCROLL COMMAND IS TO DELAY THE PHASE 1 & 2 CLOCKS TO THE MEMORY. DEPENDING ON THE SETTING OF THE 10K POT ON IC3, THE SCREEN WILL SCROLL UP OR DOWN ON COMMAND. THE TAPES ON IC4-1 AND 13 (CURSOR BOARD) MUST ALSO BE CUT. IC3-9 NORMALLY IS CONNECTED TO IC4-1 (UP) FOR THE CURSOR TO RESET TO TOP LEFT BUT WILL RESET TO BOTTOM LEFT IF CONNECTED TO IC4-13 (DOWN). WITH CURSOR CLEAR SWITCH IN THE NORMAL POSITION (AND NO SCROLL COMMAND) THE TVT OPERATES AS ALWAYS. IN THE DOWN AND SCROLL POSITIONS, THE CURSOR WILL RESET TO BOTTOM LEFT, THE TVT WILL SCROLL UP ONE LINE AND PROVIDE A BLANK BOTTOM LINE ON A SCROLL COMMAND. CHANGING SW POSITIONS AND IC3 TIME CONSTANT AND TRIGGERING EDGE OF IC4 WILL DO THE SAME THING IN THE OTHER DIRECTION.
STEVE ALSO PROMISES TO PROVIDE US WITH A HARVARD BIPHASE CASSETTE TAPE UNIT INTERFACE THAT WILL WORK. WRITE HIM AND GIVE HIM SOME WORDS OF ENCOURAGEMENT AND THE CASSETTE TAPE PROBLEM MAY DISAPPEAR.

A CLEVER CONCEPT FOR HOBBYISTS HAS BEEN INITIATED IN DENVER. A SMALL GROUP OF DEDICATED GUYS HAVE GOTTEN TOGETHER AND ARE SHARING RESOURCES. THEY ARE THE DIGITAL GROUP, PO BOX 6528, DENVER, CO 80206 AND BETWEEN THEM THEY HAVE AN ENORMOUS RANGE OF RESOURCES. ANYONE NEAR THE DENVER AREA SHOULD CONTACT THEM. THEY ARE WORKING ON AN ELABORATE CASSETTE TAPE INTERFACE THEY INTEND TO SHARE WITH THE REST OF USE WHEN THEY GET IT WORKING. THEY INTEND TO DEVELOP A BASIC WHICH WILL MAKE EVERYONE OVERJOYED. THEY MENTIONED MANY OTHER THINGS THEY HAVE IN THE WORKS. PERHAPS THEY WILL GIVE US AN UPDATE OF WHAT WE CAN SHARE IN SOON. THEY HOPE TO HAVE THEIR OWN PROM PROGRAMMER SOON AND PRESENTLY HAVE ACCESS TO ONE. THEY HAVE BEEN PROVIDING ME WITH REPRINTS OF MAGAZINE ARTICLES ABOUT MICROCOMPUTERS. I'LL GIVE A BIBLIOGRAPHY AND REVIEW WHEN ROOM PERMITS. MAYBE WE CAN GET THEM TO WRITE A NEWSLETTER EDITION.

J. M. LAMIELL, 1615 COLORADO BLVD., DENVER, CO 80220 BUILT A 16 BIT MICROPROGRAMMABLE MACHINE WITH 1K MEMORY. HE IS WILLING TO SHARE INFORMATION. HE STUDIED EE AS AN UNDERGRAD AND IS NOW A JUNIOR AT THE UNIV. OF COLO. MED. SCHOOL (IT'S AMAZING HOW MANY DOCTORS AND DENTISTS ARE INTO HOBBY COMPUTERS!). HE IS PRESENTLY INVOLVED USING DATA GENERAL NOVAS IN MONITORING EKG'S AND IS WILLING TO SHARE EXPERIENCES WITH OTHERS.

HAROLD CRONIN, 55 B ROWE ST., CHINA LAKE, CA 93555 SUPPLIED A CASSETTE TAPE INTERFACE BROCHURE FOR A UNIT FOR A PDP-8. IT USES SOFTWARE TO GENERATE PULSES, RECORD GAPS, ETC., AND THE BROCHURE INCLUDES A LISTING OF THE READ AND WRITE ROUTINES. WRITE DIGITAL COMPUTER SYSTEMS 2154 ROYCE ST., BROOKLYN, NY 11234.

GREGORY HART (WA6BNV), 8948 RAMSTAD AVE., FAIR OAKS, CA 95628 PLANS TO CONSTRUCT A MORSE CODE DECODER, RTTY SPEED CONVERTOR, AND BAUDOT TO ASII CONVERTERS.

BURTON DORF, 315 OVINGTON AVE., BROOKLYN, NY 11209 EXPRESSED INTEREST IN THE MITS TERMINAL BUT CAN'T BELIVE THE HIGH PRICE AND WONDERED IF ENOUGH PEOPLE WERE INTERESTED. IF WE COULDN'T GET A PRICE BREAK. (THE SOUTHWEST TECH PROD. TVT'S APPEAR TO BE MUCH BETTER & CHEAPER.

RONALD E. SEIBEL, 10 B ADAMS ST., AVON PARK, FL 33825 SUGGESTS NEWSLETTER SUBSCRIPTIONS, PLATED THRU PC BOARDS, HAS A 4004 AND WANTS TO KNOW WHAT TO DO WITH IT, RECOMMENDS SOLID STATE SYSTEMS FOR A/D AND D/A CONVERTERS, AND WONDERS ABOUT THE COST OF TAPE READERS AND PUNCHES, DISC MEMORIES, OTHER MICROPROCESSORS, AND HOW MUCH PLATED THRU HOLES WOULD ADD TO THE COST OF THE PC BOARDS.

WILLIAM SCHENKER, M.D., 1515 NEWELL AVE., WALNUT CREEK, CA 94596 HAS HOOKED UP WITH DR. KEN MCGINNIS OF SAN MATEO AND THEY MAY DO SOME MEDICAL COMPUTER WORK TOGETHER. HE ALSO HEARD FROM SENIOR MED STUDENT MARK SPOHR. HE MAY BECOME INVOLVED IN SETTING UP AND PART TIME TEACHING A BIO-MEDICAL/COMPUTER MEDICINE CURRICULUM AT THE LOCAL JUNIOR COLLEGE.

DR WILLIAM LENNON, NORTHWESTERN UNIVERSITY, COMPUTER SCIENCE LAB DIRECTOR, EVANSTON, IL 60201 SAYS THEY ARE CURRENTLY CONNECTING AN 8008 PROCESS CONTROLLER AND AN INTELLEC 8080 TO THE COMPUTER NETWORK. HE WANTS TO ENCOURAGE FORMATION OF AN ACTIVE 8008 GROUP WITHIN THE DIGITAL EQUIPMENT USER GROUP. HE SUGGESTS BONUS-WIK MADE BY EASY ELECTRONIC CO., PO BOX M-33, FREMONT, CA FOR GETTING SOLDER AWAY FROM IC'S BEFORE REMOVAL.

J P BERNIER, 1005 GRENOBLE, STE FOY, QUE 10, G1V 2Z8 WANTS TO STANDARDIZE I/O AND CASSETTE FORMAT. (EVERYONE DOES BUT NO ONE WANTS TO SAY WHAT IT WILL BE.)

LARRY PLATE, 2320 SKYLINE WAY, SANTA BARBARA, CA 93109 IS USING MOLEX SOCKETS FOR ALL IC'S AND HAS AN ELABORATE 'MICRO-SOLDERING' SCHEME WORKED OUT. HE EXPRESSED CONCERN OVER HOW THE MARK-8 POSTER IS USED. (MY PURPOSE IN COMPILING IT WAS TO ALLOW ANYONE TO CONTACT ANYONE ELSE, --INCLUDING SUPPLIERS. I DON'T THINK ANYONE REALLY MINDS.)

GARY T. POST, 475 B BROOKS, LEMOORE, CA 93245 WAS IMPRESSED WITH THE TABLE OF CONTENTS FOR THE MARTIN BOOK. (ENOUGH GUYS HAVE ORDERED IT SO WE SHOULD GET IT SHARED AROUND WITH LITTLE DIFFICULTY. LET'S SEE. 300 PAGES AT 5 CENTS PER PAGE -----) HE THINKS WE CAN GET SOME SUPPLIERS TO PROVIDE MEMORY CHIPS, ETC. CHEAP IF WE CAN SHOW THEM THAT WE REPRESENT A LARGE MARKET. THE SEPT '74 ELECTRONICS HAS A CIRCUIT TO ADD A DIAGONAL AXIS TO ANY SCOPE. HE SUGGESTS THUMBWHEEL SWITCHES AS A WAY OF SWITCHING PORT ASSIGNMENTS AROUND. HE WANTS A STANDARD CASSETTE FORMAT. HOW CAN HE SUBSCRIBE TO 'ELECTRONIC ENGINEER'? HE USED THE SAME KIND OF MOLEX CONNECTORS FOR THE MARK-8 I/O FOR THE TV AND WILL USE A FAN TO BLOW THE HEAT OFF AND HOPES THE HEAT PROBLEM LIKE THE MARK-8 IS PLANNED A LOT BETTER.

ROBERT W. THOMAS, 910 SONMAN, PORTAGE, PA 15946 INCLUDED A DIAGRAM FOR AN INPUT BUS USING 74125'S THAT WOULD AVOID THE USE OF THE SPECIAL SIGNETIC IC'S. IT IS QUITE SIMILAR TO THE RGS FIT I/O IMPLEMENTATION SINCE MR. TITUS PROPOSED AND PUBLISHD AN I/O EXPANSION SCHEME THAT WILL PROBABLY BE ADOPTED BY MOST PEOPLE. HIS IS NOT INCLUDED HERE. WRITE HIM FOR A COPY IF YOU ARE INTERESTED.

C. S. BAUER, IEMS DEPT., FLA TECH UNIV., PO BOX 25000, ORLANDO, FL 32816 IS STILL LOOKING FOR ZERO INSERTION FORCE IC SOCKETS. (TRY CIRCUIT DESIGN, BOX 24, SHELTON, CN 06484 #STPC-01 AT $3.95.)

PETER SPOERRI WANTS INFO ON ALTERNATE POWER SUPPLIES. (INCLUDED)

ANDREW W. LEPP RECEIVED EXCELLENT SERVICE FROM JAMES ELECTRONICS AND WANTS TO KNOW THE DIFFERENCE BETWEEN AN 8008 AND 8080. (ABOUT $300 NOW, LESS LATER, ABOUT 10 TIMES AS POWERFUL, ONLY A FEW IC'S ARE NEEDED FOR A COMPUTER. WRITE TO INTEL FOR THE 8080 BOOK AND SEE THE JAN POP ELECT.)

GREG HUNTZINGER, 2332 OAKLAND ST., AURORA, CO 80010 WANTS TO BUILD A TVT FOR HIS TV STUDIO BUT WANTS TO COMMUNICATE WITH SOMEONE THAT HAS MADE THE TV MODIFICATIONS NECESSARY.

BILL MILLER IS WORKING ON A TAPE CASSETTE CONTROLLER.

MARK SPOHR, 527 LAFAYETTE AVE., CINCINNATI, OH 45220 HAS A BSEE AND IS NOW A SENIOR MED STUDENT AT UNIV. OF CINCINATTI AND IS INTERESTED IN USING THE MARK-8 FOR DIAGNOSIS, TREATMENT, DRUG DOSAGE INTERACTIONS, AND HEALTH SYSTEMS PLANNING. (SEVERAL DOCTORS HAVE GOTTEN TOGETHER THRU THE NEWSLETTER SO FAR.)

W. H. BURTNER, RR2, BX 267, VALPARAISO, IND 46383 IS HAVING TROUBLE WITH SOME OF THE "INSIDE TERMS" SUCH AS SCROLLING, FLOPPY DISK, INTELLIGENT TERMINAL, ETC. HE IS INTERESTED IN THE RGS KIT. (I'VE SEEN THEIR MANUAL AND STAY AWAY FROM IT UNTIL THEY REVISE IT COMPLETELY AND CONVERT TO PC BOARDS. IT IS NOW A WIREWRAP LIST, A SURPLUS WIRE WRAP BOARD THAT HAS TO BE UNWRAPPED AND THE COMPONENTS. IT WOULD BE HARDER TO GET WORKING THAN A MARK-8 AND THEIR I/O SYSTEM IS WEIRD.)

ANGEL BRAVO, 10333 FELSON ST., BELLFLOWER, CA 90706 UNFORTUNATELY GOT TAKEN BY ELECTRONIC COMPONENT SALES FOR $131. IF ANYONE GETS ADDITIONAL INFO ON HOW HE CAN GET HIS MONEY BACK, PLEASE LET HIM KNOW.

TERRY G. HARRIS, 417 NORTHWESTERN DR., GRAND FORKS, ND 58201 WOULD LIKE TO BUILD AN 8080 SYSTEM BUT IS STUPPED BY THE PRESENT COST. HE PROVIDED A REPRINT FROM COMPUTER DESIGN, OCT 74 PAGE 112 THRU 117 THAT IS WORTH LOOKING UP ON A CASSETTE TAPE SYSTEM. HE APPARENTLY HAS ACCESS TO A PDP-8 BECAUSE HE WANTS THE PDP-8 CROSS ASSEMBLER. (DEC HAS AN ELABORATE PDP-8 SUPPORT PACKAGE FOR THEIR 8008 MPS MODULE SERIES.)

WILLIAM SEVERENCE, MAIN ST., CENTER LOVELL, ME 04016 SAYS POLY PACS IS EXCELLENT AND WATCH OUT FOR BAD IC'S FROM IEU. HE BOUGHT THE PRECISION SYSTEMS POWER SUPPLY FOR $48 AND SAYS ITS GREAT BUT WOULD LIKE A SCHEMATIC. HE RECOMMENDS THE SCELBI-8H USER MANUAL. HIS FSK MODEM CIRCUIT IS IN FIGURE 6, PARTS 1 AND 2.

JOHN M. CALHOUN, 1947 CENTER ST., BERKLEY, CA 94704 OF EDUCATIONAL TESTING SERVICES SAYS ALTAIR ELECTRONICS WAREHOUSE BURNED DOWN (THEY ARE STILL ADVERTISING?). HE KNOWS BILL GODBOUT AND HE IS AN ALL-AROUND GOOD GUY AND HAS EVERYTHING FOR THE MARK-8. HE IS INTERESTED IN 8080'S AS SOON AS THEY GET CHEAPER AND IS INTERESTED IN A CARD READER AND PUNCH NO MATTER HOW SLOW, CLUMSY, ETC. AS IT WOULD PROVIDE A STANDARD MEANS OF DATA INTERCHANGE.

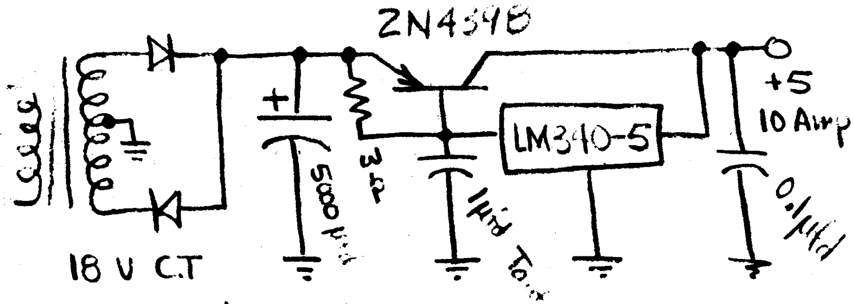
MORRIS KRIEGER, 37 EIGHTH AVE., BROOKLYN, NY 11217 IS QUITE CONCERNED WITH GETTING ACCURATE INFORMATION SO HE CAN GET A UNIT WITH PERIPHERALS RUNNING AS EASILY AS POSSIBLE. (I THINK ALL OF THE BUGS HAVE BEEN FOUND AS SEVERAL UNITS ARE NOW RUNNING SUCCESSFULLY.) HE HOPES TO USE A TVT, CASSETTE TAPE, AND PAPER TAPE READER AND PUNCH.

DAVE BOWLES, 4501 GLEN HAVEN RD., SOQUEL, CA 95073 SAYS HE ORDERED AN 8008 FROM KA ELECTRONICS FOR $66 AND HAS EXPERIENCED 5% FAILURES FROM IEU SO TEST THEM BEFORE SOLDERING THEM IN. HE HAD THE SAME TROUBLE WITH SOLDER BRIDGES ON THE MEMORY BOARDS THAT EVERYONE ELSE IS HAVING. HE WOULD LIKE TO PROPOSE A USER GROUP CONFERENCE. (HOPE YOU GET TOGETHER WITH OTHER BUILDERS IN YOUR AREA BY WAY OF THE ROSTER.) HE WANTS A CHEAP 8080 (THAT'S SEVERAL MONTHS AWAY) OR A 8008-1 (WORD HAS IT THAT MOST OF THE MICROSYSTEM INTERNATIONAL MF8008'S RUN AT 800 KC).

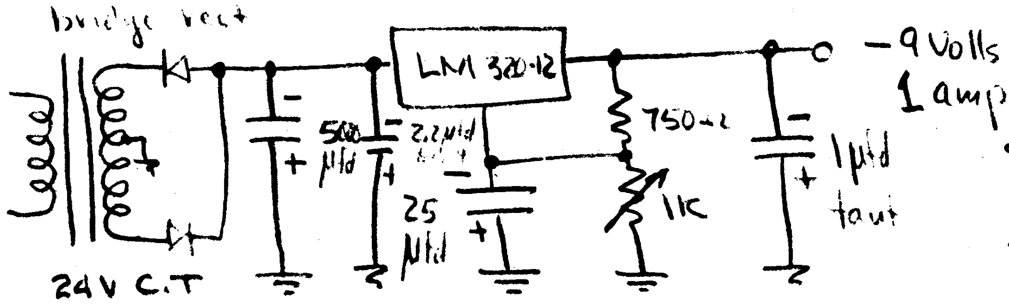
MERRY CHRISTMAS EVERYONE. HOPE SANTA BRINGS YOU AN 8080 AND 16K OF 2102'S. HOPE YOU FIND THE INFO HERE READABLE AND USEFUL. I AM SICK AND TIRED OF WRITING, TYPING, DUPLICATING, FOLDING, STAMPING, ETC. NOW ITS TIME TO GET MY 8008 SYSTEMS AND TVT RUNNING. THANKS FOR YOUR PATIENCE.

SINCERELY,
HAL SINGER

Figure A. National [illegible] Supply Circuits

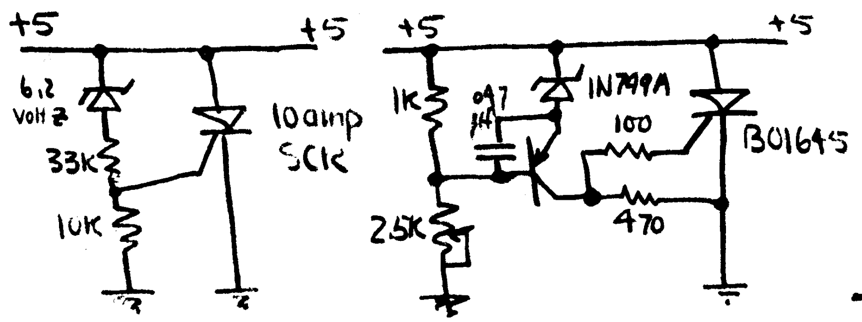


See page 1-41 National Linear IC Data Book



See Page 1-30 National Linear IC Data Book

Figure B Crowbar Circuits



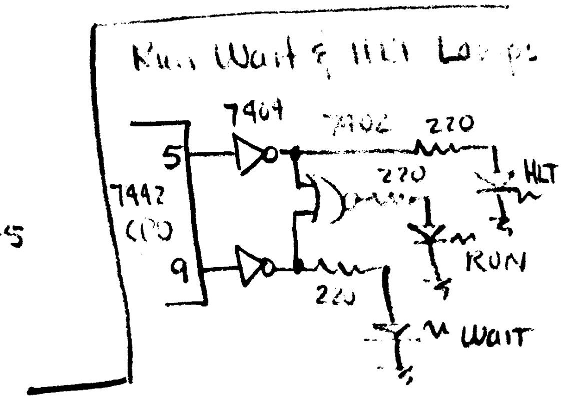
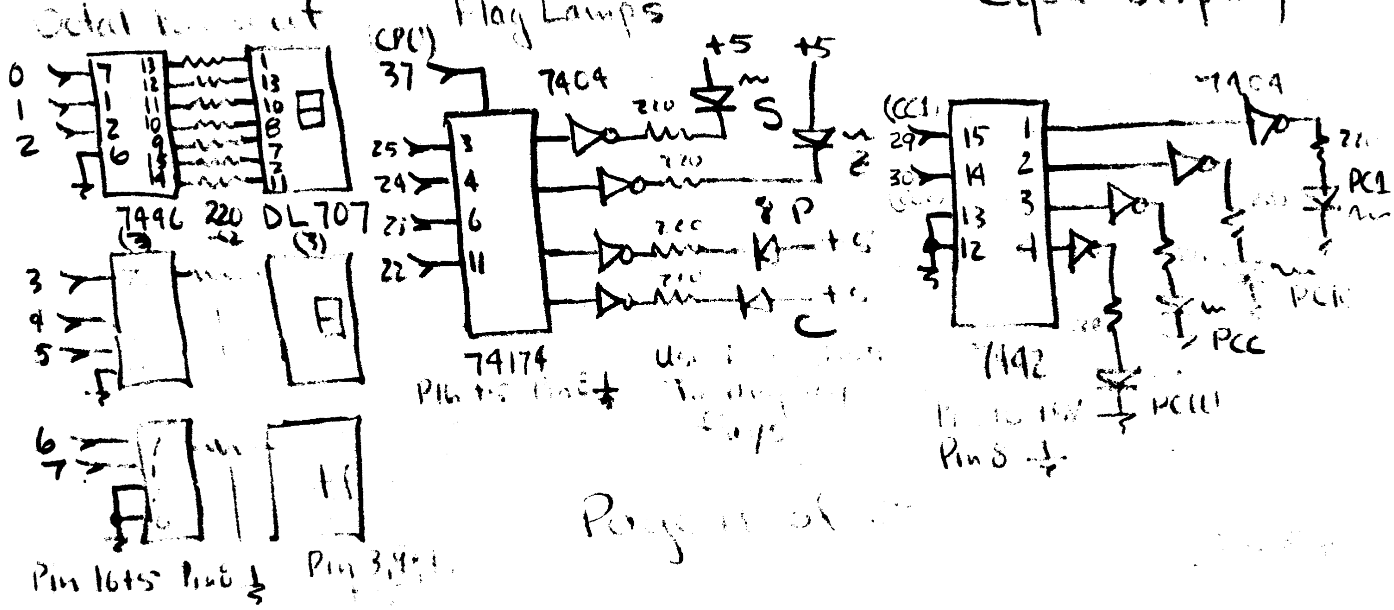


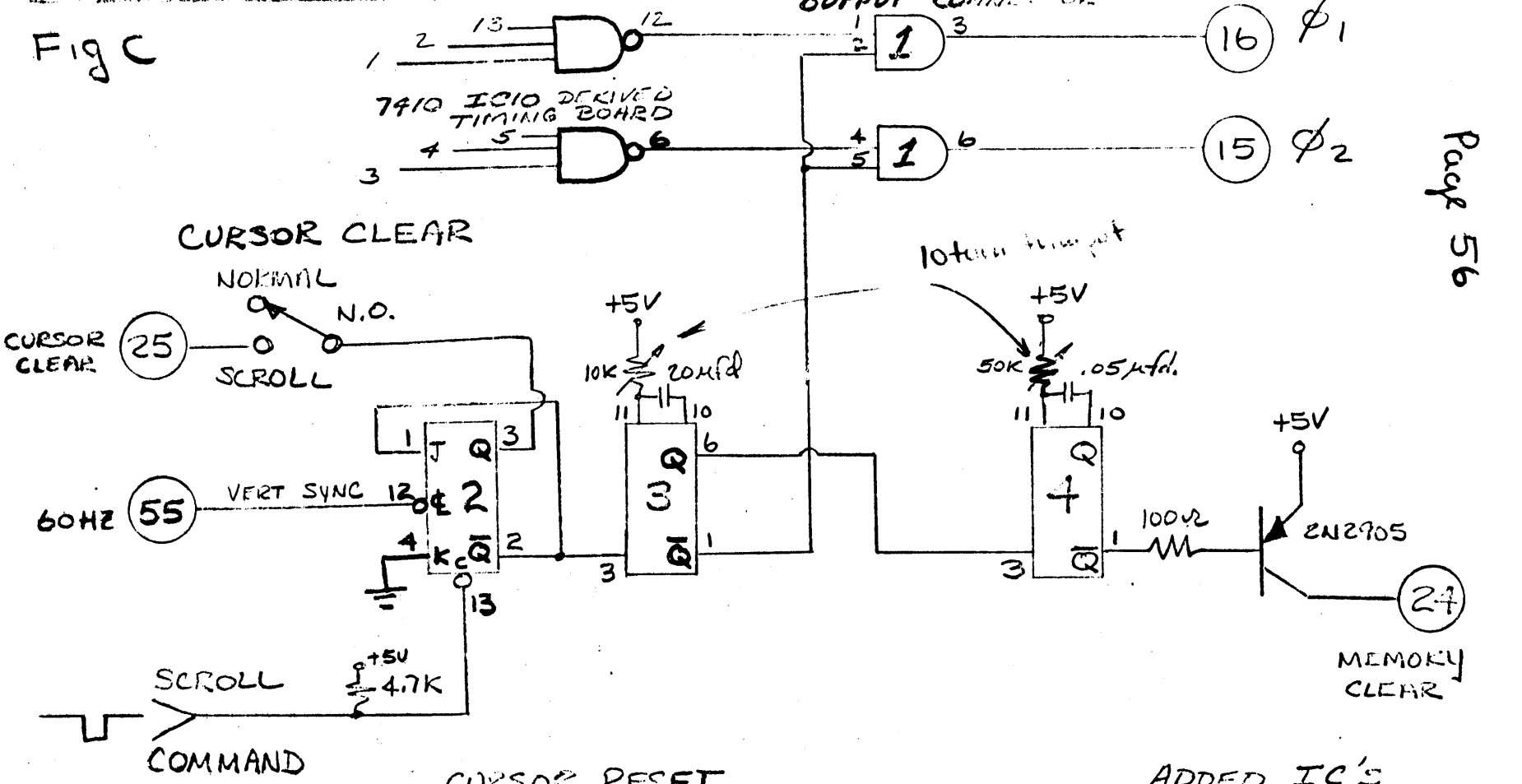
Figure C Larry Pleskac's Display Circuits



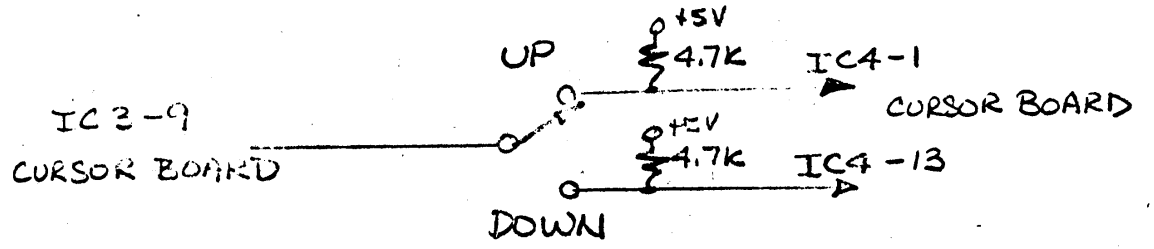
Page [illegible] of [illegible]

SCROLLING, CURSOR RESET AND LINE TIME

Fig C



CURSOR RESET



ADDED IC'S

IC 1	7408	V_{CC} PIN 14
IC 2	74107	
IC 3	74121	GND PIN 7
IC 4	74121	

Steve Ciarcia

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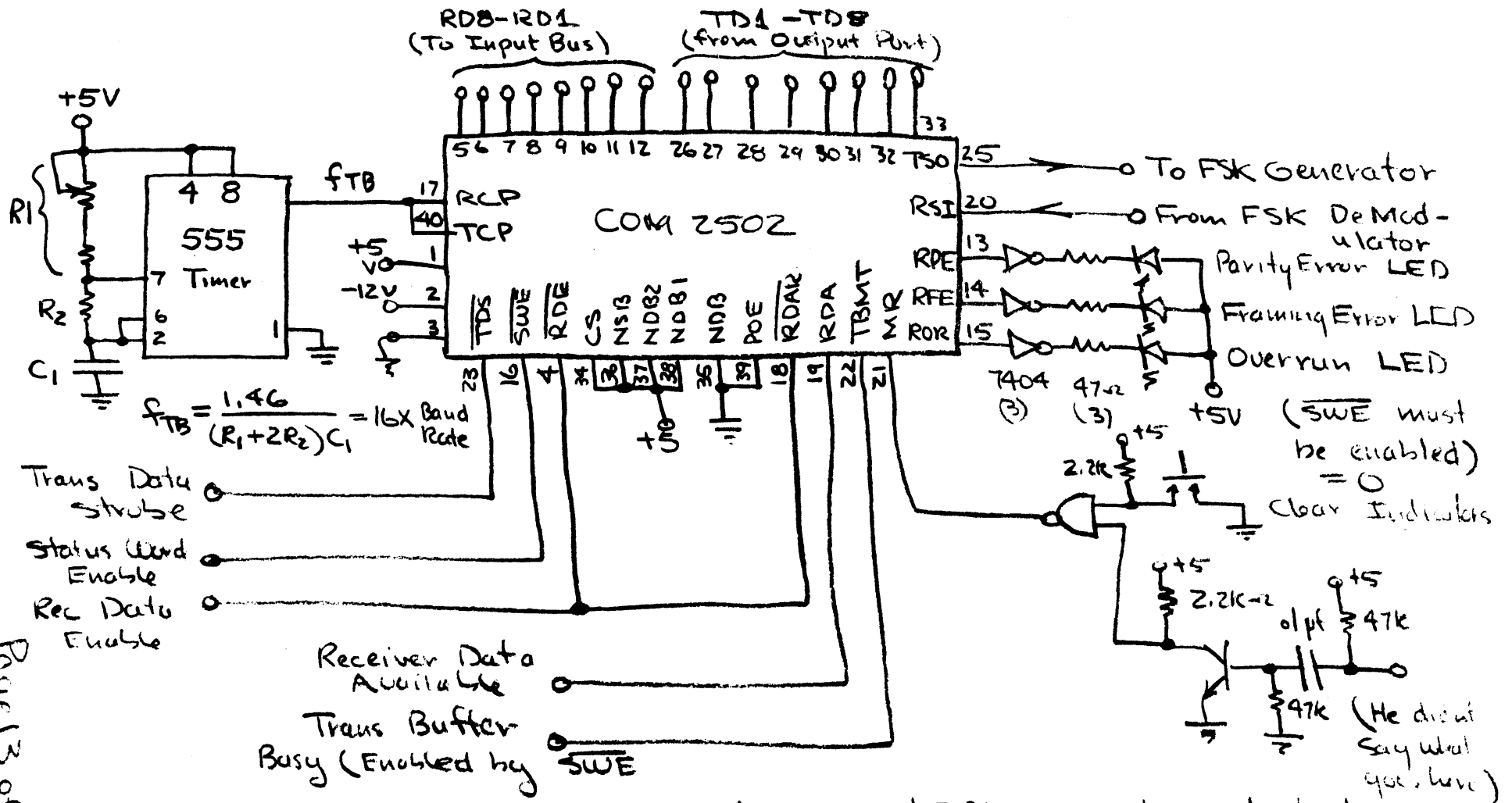


Fig D Severence's FSK Modem - Page 1

Order COM 2502 UART For $9.95 from Celetron Electronics 1618 James St, Syracuse, NY 13203

Note: RDA & TBMT may be applied to data input bus as a flag word. Periodically this word would be enabled by SWE and checked for activity. Or, SWE could be left permanently enabled and RDA could drive Mark-8 Interrupt Input.

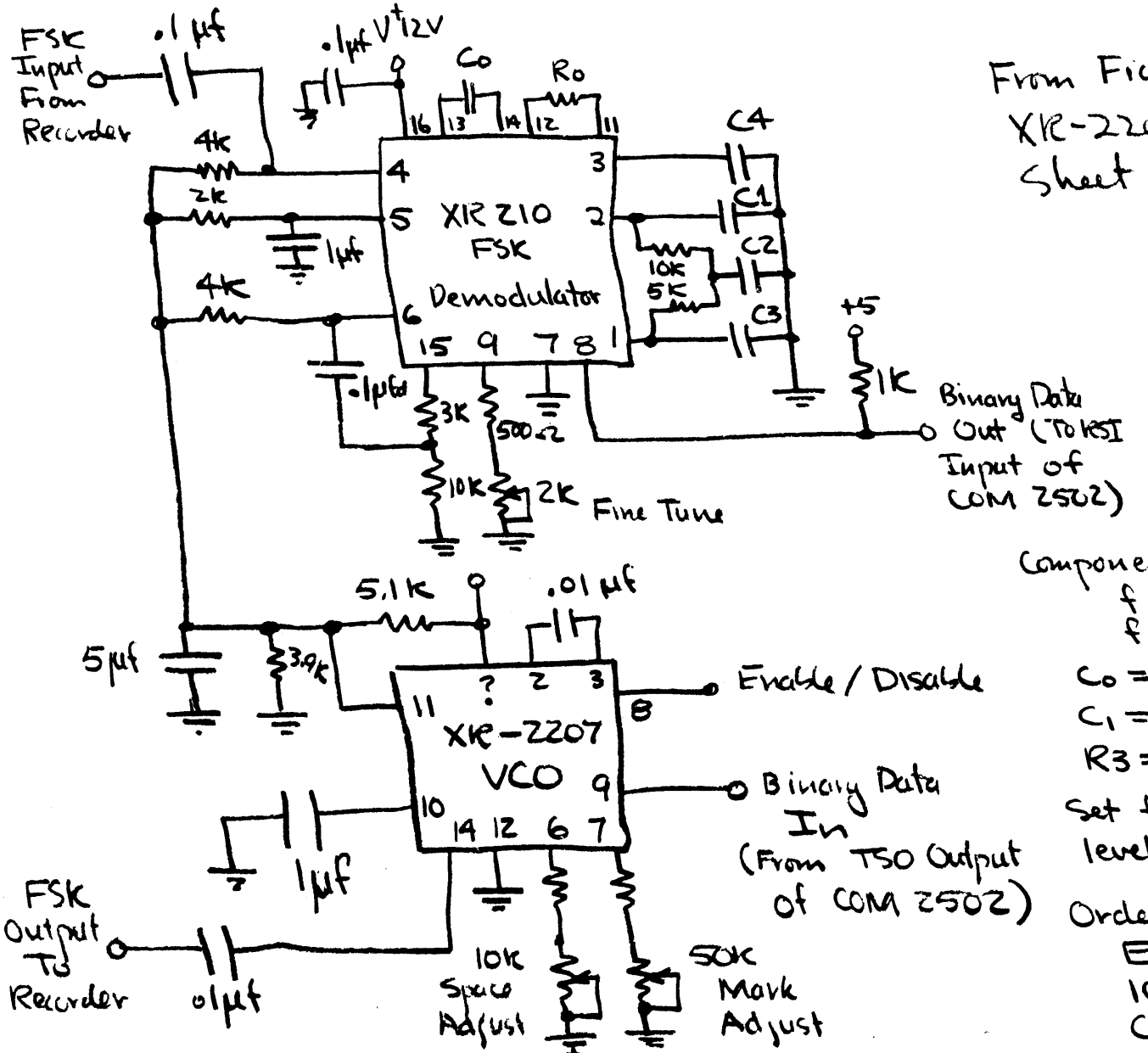


Fig D Severence's FSK MODEM
Page 2

From Fig 20 EXAR XR-2207 VCO Data Sheet

Components for 300 Baud
f_{space} = 1070 Hz
f_{mark} = 1270 Hz
C_o = .22 µf R_o = 5.1 K-Ω
$C_1 = C_2$ = .047 µf C_3 = .033 µf
R3 = 91K-Ω R4 = 470K
Set f_{space} first with low level on data input.

Order IC's from
EEP Corp
10180 W Jefferson Blvd
Culver City, CA
90230
213/838-1912
XR-210 $10.- XR-2207 = ?

ADDITIONS TO ROSTER AS OF DECEMBER 5, 1974

DOUG ARNOLD, HAWK PRODUCTIONS, #9 COLONIAL VILLAGE, BROOKINGS, SD 57006

A. C. ACTON, BOX 31, MIDLAND, MI 48640 IS INTERESTED IN INDUSTRIAL MINI-COMPUTER APPLICATIONS INVOLVING INSTUMENTATION, PROCESS MONITORING, SERVO CONTROL, AND WANTS TO INTERFACE A TVT, BAUDOT TTY, PLOTTER, AND SERVO ACTUATORS.

BOB ALBRECHT, PEOPLE'S COMPUTER CO., PO BOX 310, MENLO PARK, CA 94025 SEE FRONT OF NEWSLETTER FOR DETAILED INFO ABOUT BOB'S COMPANY.

HARRY E. ALLEN, 428 S. SPRING AVE., LAGRANGE, IL 60525

D. BERGGREN, 9207 SW 43RD AVE., PORTLAND, OR 97219 HAS REDESIGNED THE MARK-8 AND IS MAKING HIS OWN BOARDS. HE IS USING 1103 MEMORY (MAYBE HE CAN EXPLAIN REFRESH, SHARE HIS CIRCUITS, & DESIGN A 4K MEMORY CHIP BOARD WITH REFRESH?). HE WILL USE THE MARK-8 TO CONTROL AN ELABORATE EXISTING BURGLAR ALARM SYSTEM, FOR TEMP. AND HUMIDITY CONTROL IN HIS GREENHOUSE, FOR A LAWN SPRINKLER SYSTEM, & FOR BOOKKEEPING.
HE PLANS TO ADD A MODIFIED TVT, CORE MEMORY, CASSETTE TAPE, AND MODEMS.
HE WANTS A PRINTER OTHER THAN A TTY CAUSE TTY'S ARE TOO UNRELIABLE (SLOW, UGLY, AND NOISY THEY ARE BUT UNRELIABLE THEY AREN'T, TALK TO SOME USERS AND THEY WILL VERIFY EXCELLENT LONG TERM RELIABILITY.)
ANYONE HAVE OTHER SUGGESTIONS FOR LOW COST PRINTERS?

CARL BOMGARDNER, 26 HOUSTON AVE., MIDDLETOWN, NY 10940

PABLO E. CABAN, 188 GREEN ST., BROOKLYN, NY 11222

JOHN CATTERALL, ELECTRONIC ASSOCIATES, 822 SOUTH N ST., LAKE WORTH, FL 33460 WILL USE THE MARK-8 FOR DESIGN OF MATV/CATV SYSTEMS, FOR TRANSISTOR CROSS REFERENCING, STOCK CONTROL, INVENTORY, & PRICING. HE PRESENTLY HAS AN RCA 70-15 AND AN RCA 70-35 HE IS BRINGING ON LINE.

LARRY D. CHANDLER, 550 SNELLING AVE., NORTH, APT. 203, ST PAUL, MN 55104 IS A DIGITAL SYSTEMS DESIGNER INVOLVED IN MINICOMPUTER PROGRAMMING.

NEVILLE H. CHANDLER, 210 ROSE ST., METUCHEN, NJ 08840

KENNETH E. CHARLTON, PROGRAMMING METHODS, GTE INFORMATION SYSTEMS, 1121 SAN ANTONIO RD., PALO ALTO, CA 94303

SPENCER C. CHERRY, 3444 E. INDIANOLA, PHOENIX, AZ 85018

PROF. ROBERT Q. CHILDRESS, PO BOX 5004, TENNESSEE TECH, COOKEVILLE, TN 38501

DAVID W. CLARK, PO BOX 22, BROWNSTOWN, PA 17508

MARK A. CONDIC, 410 WOODS LANE, APT. 6A, DOWNERS GROVE, IL 60515

ROBERT CONTRI, 204 E. WILDWOOD, VILLA PARK, IL 60181

HAROLD E. CRONIN, 55B ROWE ST., CHINA LAKE, CA 93555

RICK L. CUMMINGS, 900 PARKER ST., FORT WORTH, TX 76112

ANDY DAVENPORT, 563 W. SAN JOSE AVE., CLAREMONT, CA 91711

W. E. DAVIES, 24121 MARATHON, MISSION VIEJO, CA 92675

C. G. DEGROOT, 155 W. 81 ST., #4J, NY, NY 10024 IS INTERESTED IN STORING AND RETRIEVING DATA ON A TAPE, RECORD, AND STAMP COLLECTION AND WANTS A GOOD CASSETTE CIRCUIT.

DOUG DRYE, 5202 WINCHESTER DR., GREENSBORO, NC 27406

GEORGE H. ENOS, SYSTEMS ANALYST, SCIENCE APPLICATIONS, INC., 2400 W. VALLEY PARKWAY, SP. 42, ESCONDIDO, CA 92025 WILL ADD PROVISIONS FOR TIME SHARING THE MARK-8 WITH HIS COMPANY'S DECSYSTEM-10 COMPUTER. HE IS WORKING ON A SYMBOLIC COMPILER AND WANTS TO KNOW ABOUT PRESENTLY DEFINED STANDARDS. (ARE THERE ANY?)

PAUL E. BEICK, 1105 MALA DR., LAYTON, UT 84041

GEORGE FISCHER, 72 SOUTH RAILROAD AVE., STATEN, ISLAND, NY 10305 WANTS TO KNOW IF THE USER GROUP IS OPEN TO BUILDERS OF OTHER 8008 SYSTEMS SUCH AS THE SCELBI, RGS, EXPERIMENTERS LIBRARY MINI (WHAT'S THIS), MP PUBLISHINGS, AND HAP 1600. (YES) HIS INTEREST IS SOFTWARE AND IN PARTICULAR HE WANTS TO PROGRAM GAMES TO RUN ON 8008 MINI'S. HE ALSO MENTIONED THE AMATEUR COMPUTER SOCIETY.

R. S. FORMAN, 1142 MYLUR CT., EUGENE, OR 97402

DAVID E. FULTON, 378 PARK AVE., RUTHERFORD, NJ 07070

P. GERSTLE, 1271 AIKINS WAY, BOULDER, CO 80303

GILCHRIST, 7385 WEST CENTRAL, WICHITA, KS 67212

S. C. GILMORE, 2914 PERKINS LN., REDONDO BEACH, CA 90278

C. C. GINN, 3733 MINOT, FORT WORTH, TX 76133

PHIL GLAZER, ACE ELECTRIC SERVICE, 40 BROADWAY, AVE., TRENTON, NJ 08618

WILLARD E. GRANGER, 201 GREENWELL DR., HAMPTON, VA 23666

K. H. GRIFFITHS, MARINE SCIENCE INST., 700 STRAND, GALVESTON, TX 77550 PLANS TO USE THE SYSTEM IN SOME OCEANOGRAPHIC INSTRUMENTS.

LEE C. HANSON, 51 CES, BOX 648, APO SAN FRANCISCO, CA 96366 HAS HIS COMPUTER COMPLETE BUT IS AWAITING THE POWER SUPPLY.

BRO. R. W. HARRIS, MONSIGNOR FARRELL HIGH SCHOOL, 2900 AMBOY RD., STATEN ISLAND, NY 10306 PLANS TO USE THE MARK-8 AS A TEACHING TOOL FOR ASSEMBLY LANGUAGE AND USE IT AS A DATA CONCENTRATOR TO USE THEIR TWO LOCAL TTY TERMINALS DURING SLOW HOURS. HE IS WRITING AN ASSEMBLER THAT WILL RUN ON THE TIMESHARE TERMINAL AND OUTPUT OBJECT CODE ON PUNCHED TAPE.

HARVEY HEINZ, 9730 TOWNLINE DIVERSION, SURREY B.C. CANADA, V3S 4N7 IS GOING TO UNDERTAKE CONSTRUCTION OF A LOW COST MARK SENSE CARD READER AND WILL USE HIS MARK-8 FOR GAMES. HE PRESENTLY BUILDS INDIVIDUAL GAME MACHINES.

LARRY HENNE, 707 POTTER DR., COLORADO SPRINGS, CO 80909

DAVID HIGGINS, KHIG/STEREO 105, PO BOX 1106, PARAGOULD, AR 72450 WOULD LIKE FOR US TO GET PL/M AND COMMIT IT TO PROM. (GOOD IDEA, EXCEPT PL/M IS A HUGE FORTRAN IV PROGRAM THAT RUNS ON A BIG MACHINE THAT CAN HANDLE FORTRAN IV.)

DR. RUDOLF HIRSCHMANN, 1345 S. BEVRERLY GLEN, #1, L.A., CA 90024 IS ESPECIALLY INTERESTED IN GETTING A TEXT EDITOR PROGRAM FOR THE MARK-8 AND WOULD LIKE A MODEM CIRCUIT FOR CONNECTING IT TO THE UNIVERSITY COMPUTER.

PROF. PIERRE M. HONNELL, WASHINGTON UNIV., EE DEPT., SAINT LOUIS, MO 63130 IS PRESENTLY INVOLVED IN COMPLETION OF THE MATRIC COMPUTER, AN ANALYTIC MACHINE FOR SOLUTION OF MATRIC EQUATION SYSTEMS AND HOPES TO TIE IN A DIGITAL MACHINE AS SOON AS POSSIBLE.

MARK A. HUTCHINSON, RT. #4 BOX 306, JACKSON, OH 45640

JOE T. HUFFMAN, 1010 WASHBURN ST., CORONA, CA 91720

STEVE INGOGLIA, 1163 ROSEMARY ST., DENVER, CO 80220

LARRY S. JACOBSON, DEPT. OF PSYCHOLOGY, COLORADO STATE UNIV., FORT COLLINS, CO 80523 IS A GRAD STUDENT IN EXPERIMENTAL PSYCHOLOGY AND WILL USE THE MARK-8 TO AUTOMATE A DISCRIMINATION APPARATUS FOR USE WITH PRE-SCHOOL AGED CHILDREN.

GARY E. JOHNEY, PSC BOX 6967, APO, SAN FRANCISCO, CA 96237 PLANS TO ADD LOW COST SHIFT REGISTER MEMORY (I'M WORKING ON THE SAME IDEA, GARY, SINCE I HAVE LOTS OF 1K S.R. I GOT VERY CHEAP.).

HARRY E. V. JOST, 111 WAVERLY ST., SHILLINGTON, PA 19607

T. N. KASPER, 2030 GREGORY ST., SAN DIEGO, CA 92104
DONALD R. KELLEY, FACILITY ENGINEER, FORT MCNAIR, WASH. D.C. 20319

RODNEY KOELLING, 1500 SPARKMAN DR., 12H, HUNTSVILLE, AL 35805

GARY W. KRAMER, RESEARCH ASSISTANT, DEPT. OF CHEM., PURDUE UNIV., WEST LAFAYETTE, IN 47907

A. KULESZA, 3014 N. HAUSSEN CT., CHICAGO, IL 60618

DALE J. LAMOTHE, 53 BONN-BADGODESBERG, KLOSTERBERGSTRASSE 13, MUFFENDORF WEST GERMANY WILL ADD A MODEM TO PERMIT COPYING RADIO TTY SIGNALS AND IS BUILDING AN ELABORATE PUSH BUTTON ASSEMBLY TO ALLOW DIRECT INSTRUCTION ENTRY THAT USES 15 IC'S AND 100 DIODES.

BARRY LAW, 1503 N. HAYDEN ISLAND DR., PORTLAND, OR 97217

KEN LEBEIKO, OAKTON COMMUNITY COLLEGE, 7900 NORTH NAGLE, MORTON GROVE, IL 60053

BILL LEWIS, 6620 NE COTTER, KANSAS CITY, MO 64119

SOL LIBES, UNION COUNTY TECHNICAL INSTITUTE, 1776 RARITAN RD., SCOTCH PLAINS, NJ 07076

GEOFFREY D. LOWE, 3615 N. PINE GROVE, APT. 3W, CHICAGO, IL 60613

JIMMY LOGOTHETIS, 107 6TH ST., BROOKLAWN, NJ 08030

LUM LOO, 709 QUINTARD, ANNISTON, AL 36201

CLINT MCDOWELL, ELECTRONICS DEPT. CHAIRMAN, DIABLO VALLEY COLLEGE, PLEASANT HILL, CA 94523

L. MCFAWN, 2063 TRIUMPH DR., FAIRBORN, OH 45324

JEROLD R. MCGONEGLE, 5320 MOULTRIE RD., SPRINGVALE, VA 22151 EXPECTS TO USE HIS MARK-8 & TVT FOR A COMPUTER FOOTBALL GAME.

DAVE MALLERY, 1701 AGUA FRIA, SANTA FE, NM 87501 HAS BEEN A PROGRAMMER FOR EIGHT YEARS.

PHIL MORK, 12 WOODLAND RD., WESTON, MA 02193 PROVIDED SOME CIRCUITS FOR PERIPHERALS HE IS IS BUILDING. FIGURE 1 SHOWS A SCHEMATIC OF HIS MODEM CIRCUIT, FIGURE 2 SHOWS HIS INTERRUPT EXPANSION SCHEME, FIGURE 3 SHOWS HOW TO CONTROL AC LOADS FROM THE MARK-8, FIGURE 4 SHOWS HIS SCOPE DRIVER CIRCUIT, FIGURE 5 SHOWS HOW HE WILL CONNECT A ROM FOR OFTEN USED ROUTINES, FIGURE 6 SHOWS HIS CONTROL OUTPUT PORT ASSIGNMENTS AND A SAMPLE LOADER PROGRAM THAT CAN BE PUT IN ROM, FIGURE 7 SHOWS HOW HE WIRED HIS SWITCHES SO THAT YOU CAN'T JAM UNLESS YOU ARE IN SINGLE STEP, AND FIGURE 8 SHOWS HIS TVT/MODEM SELECTOR CIRCUIT. HE USED A 5MHZ CRYSTAL FROM POLY PACS AND DIVIDED BY 5 INSTEAD OF 4 USING A 7490. (THANKS FOR ALL THE INFO, PHILIP.)

ROBERT A. MAYER, RD #1, MILLMONT, PA 17845.

JIM MEHL, PO BOX 632, LOS GATOS, CA 95030 WILL USE HIS MARK-8 AS AN INTELLIGENT TERMINAL WITH LOCAL EDITING CAPABILITIES, FOR PERSONAL ACCOUNTING AND RECORD KEEPING, AND AS A CONTROLLER FOR ELECTRONIC GAMES.

AL J. MEIER, PSC4, BOX 10106, KEESLER AFB, MS 39534

ROBERT MIRAR, PO BOX 2028, CHAPEL HILL, NC 27514

RALPH H. MOLTZAU, 1568 MOLINA ST., HONOLULU, HI 96818

DON MORGAN, 226 N. PARK DR., SEYMOUR, IN 47274

G. SCOTT MORRIS, PLEIADES, 964 CREST ROAD., DEL MAR, CA 92014 HAS HIS OWN PDP-8/S AND TTY.

DON N. MORRISON, C/O ALBERTA RESEARCH, 11315 17 AVE., EDMONTON, ALBERTA, CANADA T6G 2C2

THOMAS NEWMAN, 2230 SWEETWATER DR., SAN LEANDRO, CA 94578 PLANS TO INTER FACE A CRT, KEYBOARD, CASSETTE TAPE, PAPER TAPE READER, AND A NOVA 1200 AND WOULD LIKE A FORTRAN CROSS ASSEMBLER. HIS MARK-8 USES A /4126 TRI-STATE BUS.

E. N. NOREN, 111-11033-127 ST. EDMONTON, ALBERTA, CANADA.

HAROLD L. NOVICK, ATTORNEY AT LAW, 2810 HENDERSON CT., WHEATON, MARYLAND ORDERED FROM ELECTRONIC COMPONENT SALES AND MOST OF HIS ORDER WAS FILLED BUT A REFUND WAS SENT INSTEAD OF THE 8008. HE RECOMMENDS THAT YOU AVOID DEALING WITH THEM. (I WONDER IF 'ATTORNEY AT LAW' HAD SOMETHING TO DO WITH GETTING THE ORDER?)

MOGENS PELLE, BIRKHOJTERRASSERNE 416C, 3520 FARUM, DENMARK INTENDS TO USE HIS MARK-8 FOR ON LINE CONTROL OF EXPERIMENTS.

DEAN B. PETERSON, JR., 801 SANS SOUCI DR., APT. 201, RALEIGH, NC 27609

SSG JACKIE W. PIERCE, 460-84-4884, 178 SIG. CO., APO NY, 09102 IS USING A PE 'SCOPE WRITER' WITH THE SOUTHWEST TECH. PRODUCTS (STP) KEYBOARD, IS DOING SOME RESEARCH ON CASSETTE TAPE DATA RECORDING AND WANTS TO STAN-DARDIZE THE CASSETE FORMAT AMONG MARK-8 USERS SO TAPES CAN BE TRAD-ED. HE PROMISES TO FURNISH A CIRCUIT OF THE MODEM. HE IS ALSO WORKING ON A PENCIL MARK 3X5 FILING CARD READER. EACH SIDE OF A CARD WOULD ACCOMODATE ABOUT 35 8-BIT WORDS AND THEIR SYNCH BITS. THE CARD WOULD BE READ BY MOVING THE SENSOR ARM ACROSS THE CARD BY HAND. (THIS IS EXCIT-ING! KEEP WORKING ON IT JACKIE AND LET US KNOW HOW IT WORKS OUT.) HE EXPECTS TO USE HIS MARK-8 FOR CONTROL OF EXPERIMENTS, DATA ACQUISITION, INFORMATION FILING ON CASSETTES, TEACHING AID, HOUSE SECURITY DEVICE, AND FOR HOUSEHOLD CONTROL FUNCTIONS.

NICK PINE, MS 08, GTE/IS, EAST PARK DRIVE, MT. LAUREL, NJ 08057

FRANK RACO, 1100 E. RENTON ST., CARSON, CA 90745

ROBERT REILING, 193 THOMPSON SQ., MOUNTAIN VIEW, CA 94043

R. D. REINEBECK, 899 FAIRFIELD RD., NORTH VANCOUVER, B.C., CANADA

GEORGE W. ROMPOT, 216 COLLIER DR., SPRINGFIELD, IL 62704 HOPES TO WRITE PROGRAMS THAT WILL SIMULATE OTHER MINI-COMPUTERS AND IS EMPLOYED AS AN IBM 370/155 SYSTEMS PROGRAMMER FOR AN INSURANCE COMPANY.

R. O. RODGERS, 14428 SAN ARDO RD., LA MIRADA, CA 90638 TALKED TO A MICRO SYSTEMS INT. SALES REP. AND THEY CONSIDER THE MARTIN RESEARCH BOOK "MICRO COMPUTER DESIGN" THE BEST ONE AVAILABLE. MARTIN'S PRICE FOR THE BOOK AND THE MF8008 IS NOW $120.

W. MICHAEL SCHAFER, 27 N. MIDLOTHIAN, MUNDELEIN, IL 60060

BENJAMIN SHAW, 1731 BONAIRE WAY, NEWPORT BEACH, CA 92660 THINKS THAT HE CAN OBTAIN LOTS OF 8008 SOFTWARE THAT HE CAN SHARE WITH UTHER USERS.

DAVID SCHULTZ, 122 MONTE VISTA, LOST ALAMOS, NM 87544 HOPES TO ADD OCTAL KEYBOARD ENTRY, OCTAL LED READOUT, AND HOPES TO BUILD A SPEECH SYNTHESIZER AND AUDIO RECOGNIZER EVENTUALLY.

MICHAEL SEMANCZUK, 40 WILLOW ST., ELMWOOD PARK, NJ 07407 PLANS TO INTERFACE HIS MARK-8 TO A LARGER COMPUTER AT WORK TO AID IN DEBUGGING.

DAVID W. SHORTHILL, 15567-12TH AVE., N.E., SEATTLE, WA 98155

SOLID STATE MUSIC, JOHN R. BURGOON, 1222 CAROLYN DR., SANTA CLARA, CA 95050 IS INTO THE DESIGN OF COMPUTERIZED CONTROL OF ELECTRONIC ORGANS AND WANTS TO COMMUNICATE WITH OTHERS WITH SIMILAR INTERESTS. SEE FLYER IN BACK LISTING MARK-8 PARTS HIS COMPANY CAN SUPPLY BUILDERS.

CHARLES SOOLEY, 28 KILMANAGH COURT, BRAMPTON, ONTARIO CANADA L6W 1A7

J. SOUDRIETTE, DRAWER 7267, NORFOLK, VA 23509

KEN STAMBAUGH, 5009 GUIDE MERIDIAN RD., BELLINGHAM, WA 98225

NORMAN F. STANLEY, PO BOX 723, ROCKLAND, ME 04841 IS WORRIED ABOUT THE RELIABILITY OF DISCOUNT PRICED 8008'S. (RUMOR HAS IT THAT AT LEAST A COUPLE OF COMPANIES ARE OR WERE SELLING HIGH TEMP. FALLOUTS. M&R AND KA ELECTRONICS BOTH SAY THEY ARE SELLING FIRST RUN GUARANTEED MF8008'S. YOU'LL HAVE TO INQUIRE ABOUT WHAT OTHERS ARE SUPPLYING.)

JAMES A. STARK, M.D., 485-34TH ST., OAKLAND, CA 94609 WANTS TO KNOW IF ANYONE IS INTERESTED IN AN 8008 ASSEMBLY PROGRAM THAT RUNS IN "RUSH" ON THE INTERNATIONAL TIME SHARE SYSTEM.

F. STAUBER, 183 WOODVILLE, TORONTO, CANADA M4J 2R4 WILL USE HIS MARK-8 FOR SPEED, DRIFT, AND HEADING CALCULATIONS FOR AIRPLANES AND TO RECEIVE AND SEND MORSE CODE. HE IS A GOVERNMENT COMPUTER SUPERVISOR FOR A 370/158.

ROBERT SUDING, (WOLMD), 370 SOUTH QUEEN ST., LAKEWOOD, CO 80226 HAS HAD HIS MARK-8 RUNNING FOR 2 MONTHS NOW WITH 512 BYTES OF MEMORY SOON TO BE EXPANDED TO 1K. HE HAS ADDED OCTAL KEYBOARD DATA ENTRY AND READOUT. HE WILL SOON HAVE A NEW LED BOARD BUILT WITH LED OCTAL READOUTS. HE IS MODIFYING THE TVT TO USE A MCM6571 UPPER & LOWER CASE CHARACTER GENERATOR.

ROBERT SWARTZ, 195 IVY LANE, HIGHLAND PARK, IL 60035

TIM TOPOLE, 2742 N. CALIFORNIA, CHICAGO, IL 60647 WILL BE INTERFACING A SUPER BEE CRT AND A FLOPPY DISK.

ADAM TRENT, NASA/STDN, ASCENSION, BOX A, PATRICK AFB, FL 32925 IS FINISHING THE MARK-8 AND IS ABOUT TO START ON THE TVT AND WANTS TO KNOW WHERE TO GET USED TTY'S, DATA SHEETS FOR THE 8263'S AND 8267'S (WRITE FOR THE DATA BOOKS DESCRIBED EARLIER). HE SUGGESTED THE AUGAT SOCKET PIN SOLUTION TO THE MEMORY BOARDS. HE PROVIDED INFO ON MNH APPLIED ELECTRONICS AND TRIED AN ORDER OF ICA, ICC, AND ICD IC'S AND FOUND THEM ALL GOOD BUT AN ORDER OF 7400 REJECTS PRODUCED NO GOOD UNITS. ADAM IS ON A REMOTE ISLAND IN THE SOUTH ATLANTIC AND WANTS TO HEAR FROM PEOPLE REGARDING WHAT THEY INTEND TO DO WITH THEIR MARK-8'S.

JON TERNER, 301 OCEAN AVE #8, SANTA MONICA, CA 90402

JON TYLER, 5625 JOHN R. RD., TROY MI 48084 IS MAKING HIS OWN PC BOARDS. HE MADE IS OWN CAMERA FROM A MESHNA $11 LENS. HE IS MOST INTERESTED IN WORD PROCESSING AND TYPESETTING APPLICATIONS.

JORGE VILLEGAS, AP. AEREO 55161, MEDELLIN, COLUMBIA, S.A. IS INTERESTED IN A TVT AND WOULD LIKE TO BUY AN ASSEMBLED UNIT. (PERHAPS THE NEW SOUTHWEST TECHNICAL PRODUCTS KIT IS WHAT YOU ARE LOOKING FOR.)

WILLIAM A. WALDE, 28 TUTTLE DR., ACTON, MA 01720 RECEIVED HIS PC BOARDS IN SEPT. WITH REFERENCE NUMBER 2009 (DOES THAT MEAN OVER 2000 BOARD SETS HAVE BEEN SOLD?). HE SAID BILL GODBOUT ELECTRONICS, BOX 2673, OAKLAND AIRPORT, CA 94614 SAID HIS $50 8008 IS AN INTEL UNIT TESTED AT 1 MHZ AND GUARANTEED. WILLIAM CAUTIONS YOU ON ORDERING 8263 AND 8267'S FROM A SIGNETICS DISTRIBUTOR. USE THE RIGHT NUMBER OR YOU MAY GET A MILITARY GRADE CERAMIC FLATPACK AT $32.10. (N8263N & N8267B ARE RIGHT) HE SUSPECTS THE MOLEX CONNECTOR PART # IS WRONG AND WANTS TO KNOW IF 1101, 1101A, AND 1101A1'S CAN BE MIXED ON THE SAME BOARD. HE OBTAINED A CIRCULAR FLORESCENT LAMP WITH A MAGNIFYING GLASS IN THE CENTER TO AID IN INSPECTING AND SOLDERING THE BOARDS. HE IS AN ASSEMBLY LANGUAGE PROGRAMMER ON BIG IBM, XDS, AND BURROUGHS MACHINES. HE RECENTLY BUILT THE PE MARCH 74 LOGIC PROBE AND WAS VERY PLEASED WITH THE RESULTS.

JERRY WALKER, 761 CLAYTON, SAN FRANCISCO, CA 94117

J. W. WARD, 7236 CIRRUS WAY, CANOGA PARK, CA 91304

STEVE WASH, 7277 BLUFF ACRES DR., GREENWOOD, IN 46142 SUGGESTS THE FIG. 9 CIRCUIT SO THAT THE OUTPUT PORT LED'S WILL DISPLAY CONTENTS OF ANY OUTPUT PORT.

GREGG WEBER, 1000 PLAZA DR., APT. 311-C, STATE COLLEGE, PA 16801

ROGER S. WELLS, 18AMS BOX 13258, APO SAN FRANCISCO, CA 96367 IS GOING TO INTERFACE AN ELECTRIC TYPEWRITER.

J. SCOTT WILLIAMS, PO BOX 932, BELLINGHAM, WA 98225

PETER WOLFE, 42409 HIGHLAND DR., PO BOX 139, YARROWS, B. C. CANADA VOX 2A0 IS A STUDENT AT B. C. INSTITUTE OF TECHNOLOGY MAJORING IN ELECT/ELECTRONIC TECHNOLOGY.

CARL K. ZETTNER (W5HFG), 108 MOSS DRIVE, SAN ANTONIO, TX 78213 IS A EDP CONSULTANT AND A RADIO AMATEUR AND WILL USE THE MARK-8 FOR CONTROLLING HIS AMATEUR RADIO TTY STATION. HE POINTS OUT THAT THE DATAPOINT 2200 HAS THE SAME INSTRUCTION SET WITH ONLY FOUR EXCEPTIONS SO DATAPOINT SOFTWARE MAY BE USEABLE WITH MINOR MODIFICATIONS.

SOLID STATE MUSIC
JOHN R. BURGOON JR.
1222 CAROLYN DRIVE
SANTA CLARA, CA 95050
PHONE 296-7330

FOR THOSE THAT MIGHT BE INTERESTED, MY COMPANY HAS AVAILABLE THE FOLLOWING MARK 8 COMPONENTS:

.1 MF 25 V ERIE DISC CAPACITORS	17/$1.50
100 MF 25 V SPRAGUE TE1211 ELECTROLYTICS	1/$.40
1K OHM 1/4 WATT 5% RESISTORS	16/$1.10
1.8 K OHM 1/4 WATT 5% RESISTORS	1/$.05
33 PF DISC	1/$.10
7400 TTL	14/$2.50
7402 TTL	2/$ .40
74L04 TTL	3/$1.20
7404 TTL	13/$3.00
7474 TTL	2/$ .90
7410 TTL	2/$ .45
7420 TTL	1/$ .25
7442 TTL	5/$4.50
74123 TTL	2/$1.80
74193 TTL	4/$5.00
7475 TTL	8/$5.50
7476 TTL	3/$1.35
2501/1101 MOS 256X1 STATIC RAM	8/$16.00
8008 CPU (APPROX 3 WKS DELIVERY)	1/$60.00
MV5023 TYPE DIFFUSED RED OR CLEAR RED	33/$8.00

STATE PREFERENCE, THESE WILL BE MATCHED FOR APPROX. SAME LUMINENCE

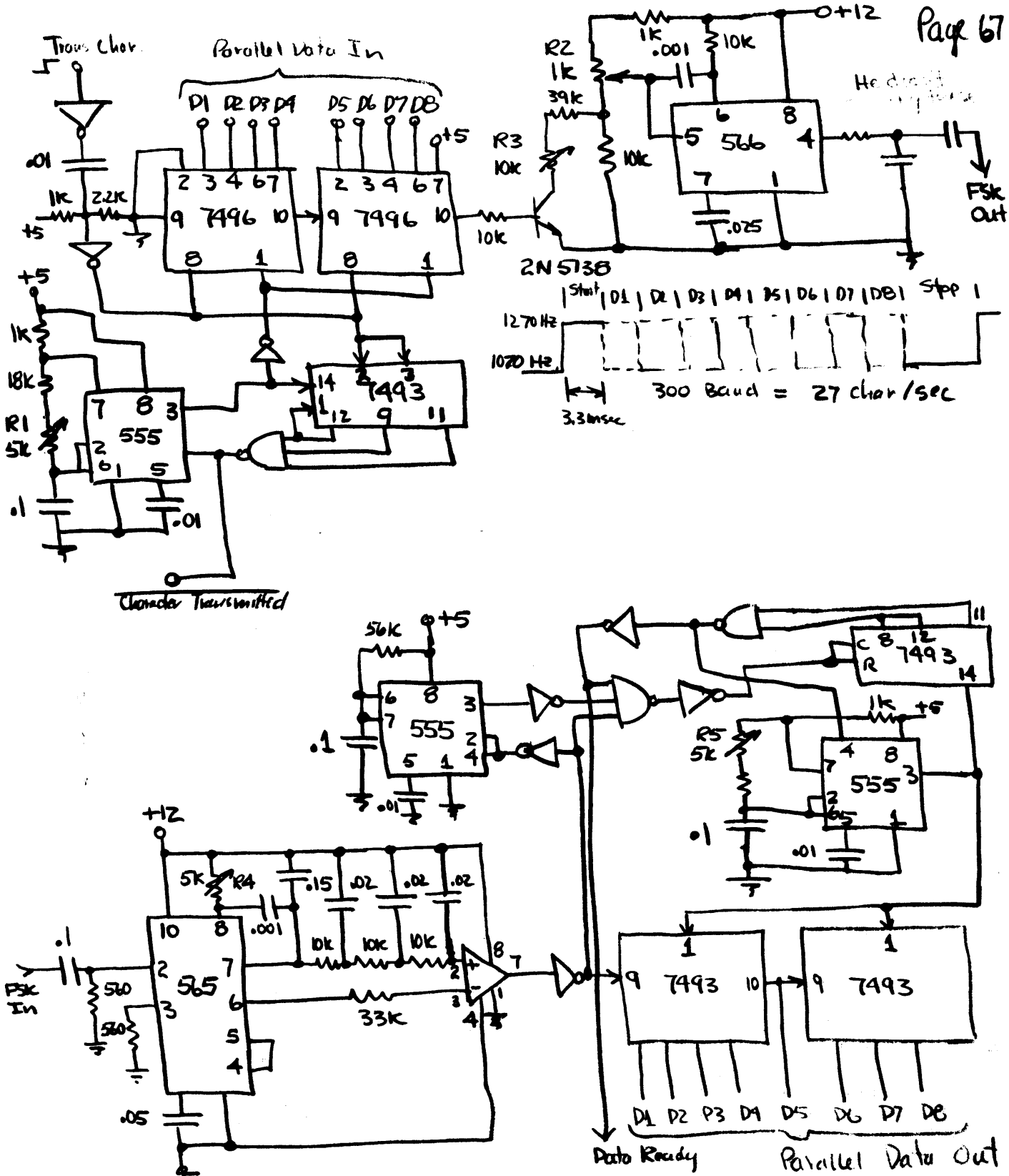
18 PIN IC SOCKET FOR 8008 1/$1.25

THE ABOVE ARE AVAILABLE IN REASONABLE QUANTITIES AT THIS TIME. DO NOT SEND MONEY FOR 8008'S AT THIS TIME. IF INTERESTED, SEND SELF-ADDR. ENVELOPE AND I WILL ADVISE WHEN AVAILABLE. ALL THE ABOVE ARE TESTED AND GUARANTEED. CALIF. RESIDENTS ADD 6% SALES TAX. I WILL MAIL 1ST CLASS WHITIN 24 HOURS UNLESS I GET SWAMPED. IF INTERESTED SEND FOR COMPLETE LIST & PRICES ON RTL, DTL, TTL, ECL, CMOS, NMOS, PMOS, DIODES TRANSISTORS, ETC. I SPECIALIZE IN SELLING TO ACADEMIC INSTITUTIONS. CAL POLY, BRIGHAM YOUNG, ETC. MY BANK REFERENCE IS: WELLS FARGO, EL CAMINO, SANTA CLARA - COMMERIAL, 1ST NATIONAL BANK OF SAN JOSE - PERSONAL. SEND CHECKS OR MONEY ORDERS TO ABOVE ADDRESS.

I HAVE A LARGE STOCK OF MEMORIES: 2602, 93410, 8223, 8225, 7489, 82S07 (74206), 1103, ETC. AND THE TOUGH TVT ICS - 8288, 2524, 4024, ETC. ALSO CLARE-PENDAR ASCII ENCODED KEYBOARDS, COMPUTER TYPE, LIKE NEW, TESTED, $40 - POSTAGE PAID.

10% DISCOUNT ON ORDERS OVER $100.00.

PC BOARDS FOR THE 8008 MINI USING 32K BIT MEMORY BOARDS FOR THE 2602 1024 BIT STATIC RAMS ARE ON THE DRAWING BOARD AND WILL BE AVAILABLE AFTER NOVEMBER. THEY WILL USE EDGE CONNECTORS, NOT MOLEX CONNECTORS.



Caps In μF
Res. In Ω

R1 Trans baud adj
R2 Trans Low freq
R3 Trans High freq
R4 Rec freq Adj
R5 Rec Baud Adj

Figure 1 Phil Morle's Modem Circuit

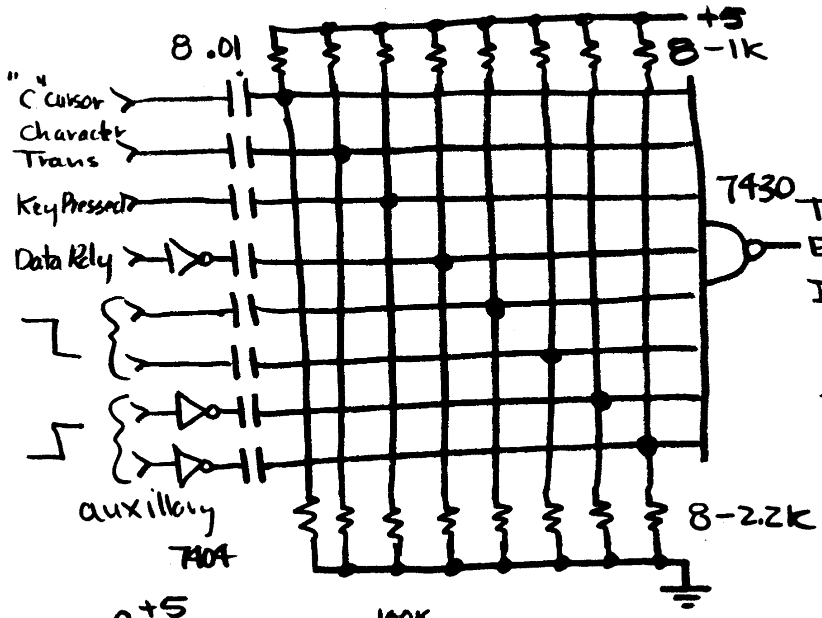


Figure 2 Phil Mork's Interrupt Exp Circuit

Ties together the Modem, Keyboard, TVT, and 4 other optional inputs — 2 pos going, 2 neg.

TVT is connected (test point C, Cursor board) to tell computer that character has been loaded and is ready for another.

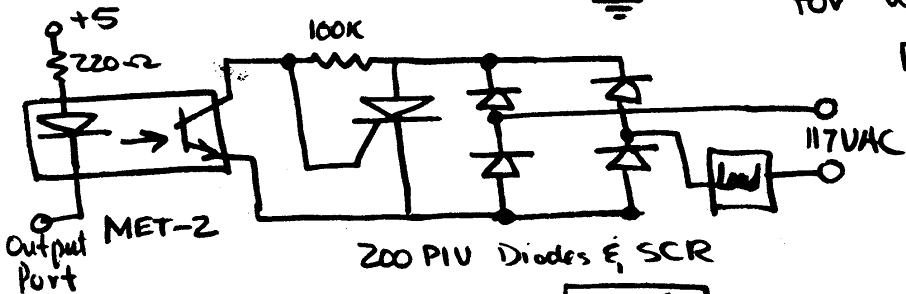


Figure 3 Phil Mork's Power Controller

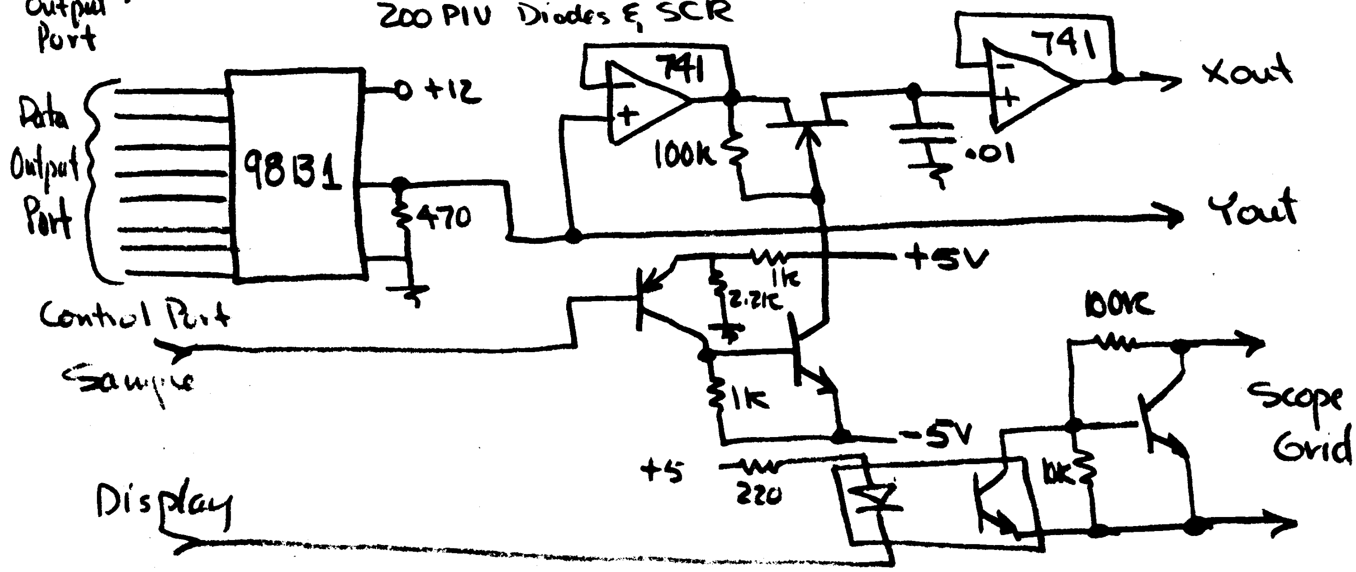


Figure 4 Phil Mork's Oscilloscope Driver Circuit
(Sample & Hold)

X is analog version of data last time sample was high
y is " " " "

Sample & [illegible] control port bits

Page 24 [illegible] 25

Fig. 5 Phil Mork's ROM Interface

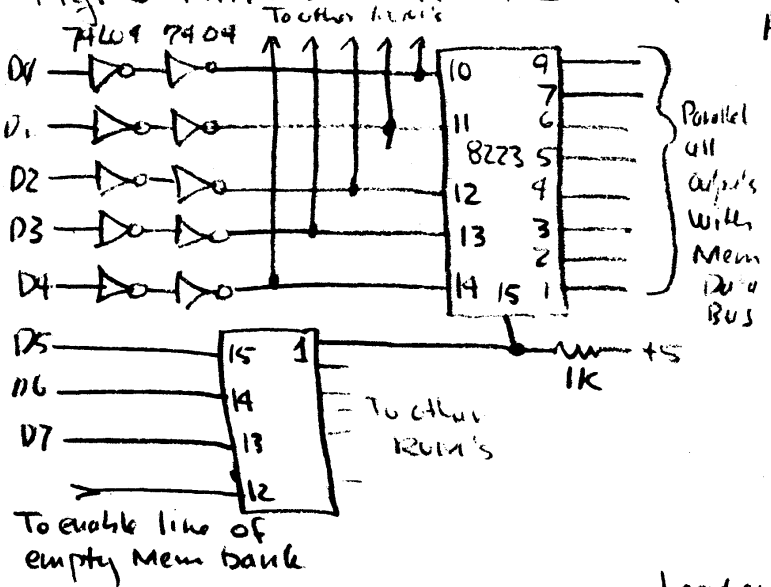


Fig 6 Phil Mork's Control Port Assignment & Loader Program

Bit 1 } Input Select.
2 }

3 Keybd Modem

4 TUT Modem

5 Sample } for Scope
6 Display }

7 } Cassette tape
8 } movement control

Pg 69

Loader Program

1	LAI	11	CALL
2	(Setup Control Port)	12	} 17
3	Out A	13	
4	LHI	14	JMP
5	(High Start Addr)	15	} 8
6	LLI	16	
7	(Low Start Addr)	17	INL
8	HLT	18	RFZ
9	INP A	19	INH
10	LMA	20	RET

To Load from cassette JAM { 1 } Go to run and turn on cassette

Fig 7 Phil Mork's Front Panel switch Mods

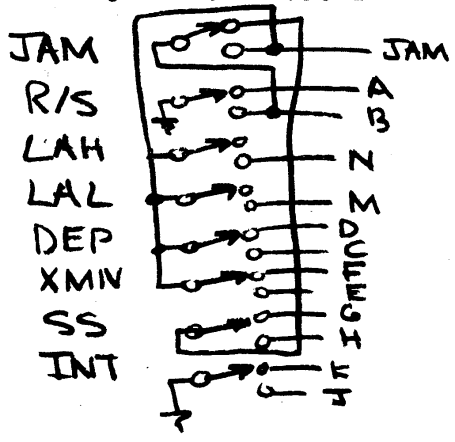


Figure 9 Steve Wuchs Output Port Display Circuit

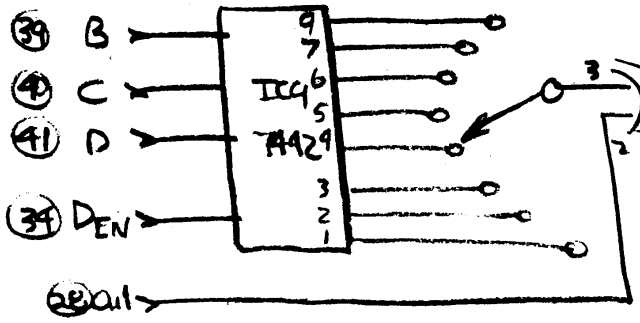
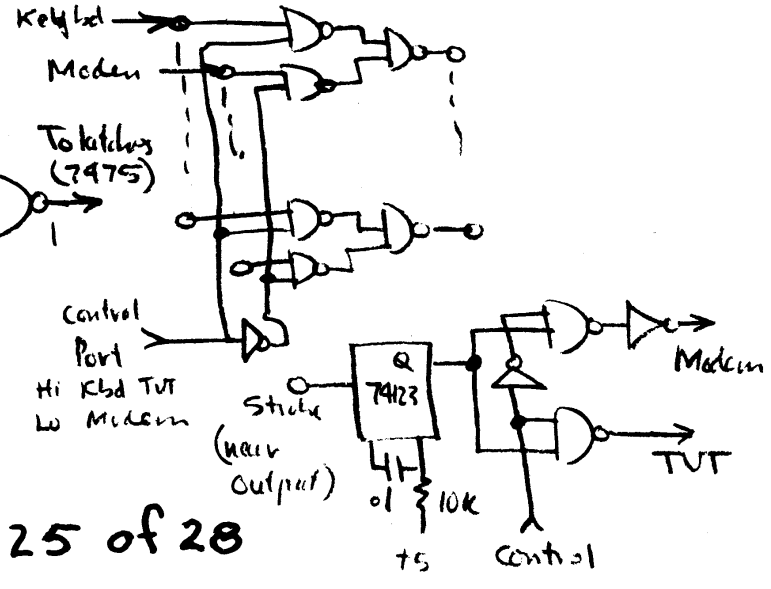
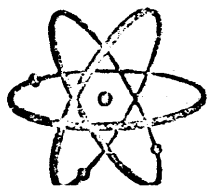


Fig 8 Phil Mork's Keybd-TUT/Modem selector. Circuit





M & R ENTERPRISES

P. O. BOX 1011
SUNNYVALE, CALIF. 94088

		HOW MANY	TOTAL
1 each 8008 CPU	$60.00	_____	_____
1 each 8008 CPU including all the resistors (5%), .1 disc capacitors and 7400's for the Mark-8 (Mini-Kit).....	75.00	_____	_____
1101 ..... ea	5.00	_____	_____
2102 ..... ea	10.00	_____	_____
1 ea 2513, 1ea 2518, 6 ea 2524 (for the TVT)	42.50	_____	_____

MAIL TO: M & R ENTERPRISES
P.O. BOX 1011
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94088

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TOTAL AMOUNT ENCLOSED _____

Order shipped within 48 hours upon receipt. Price includes first class postage in Continental U.S.

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P.O. Box 1208
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301-778-0745

1900 BAUD MODEMS

+5, -12, -12 POWER SUPPLIES

CATALOG #7 November 1974

This catalog offers some high-speed TTL or EIA MODEMS and some MOS, TTL, computer power supplies which we recently acquired. At this time we are sold out of mag. tape units and Chalco paper tape units, however, other items in catalogs 2 through 6 remain in effect. Catalog #3 is now cancelled in total. The schematic for the Ampex diode arrays in catalog #6 was incorrect; the correct diagrams appear in this catalog #7. The Augat DIP-14 IC boards are still available, but we failed to mention that they are powered on pins 1 and 8. The powering pins can be easily changed, however.

We hope you find some items of interest in this catalog. Send us a self-addressed, stamped envelope (SASE) for a free copy of any of our catalogs. Also, please be sure to include postage and insurance money with your order. We have a minimum order of $5.

We greatly appreciate your past patronage.

MNH - Applied Electronics

Cat. #DCTAU MODEM System - 1900 BAUD

This is a complete, controlled, TTL, Modulator/Demodulator system for interfacing your computer or TTL system to a standard telephone line. This Terminal Adapter Unit (TAU) will allow asynchronous EIA or TTL data transmission and receipt at up to 1900 BAUD (characters / per second). The unit is in a 5.2" X 9.7" X 13.5" metal case with front panel; it weighs 11 lbs. and contains 159 integrated circuits (74 series + 741 op amps) on 4 PC cards. Documentation for the system includes card schematic diagrams and a detailed set of specifications and signal descriptions for the MODEM card. The unit is powered and controlled through 3 - 25 pin D-connectors in the rear. There are 8 LED's on the front panel which indicate the status of the TAU in its data transmission and receipt modes. Powering for the system must be provided externally by +5v. at about 2 amps. regulated and +12v. and -12v. at about 150 ma each, regulated. These TAU's are only slightly used, but may in some cases require minor repairs. The systems originally cost nearly $1000 and were used in a nation-wide hotel reservation system, so they are ideal for computer-telephone communications. This is a beautiful system for tying your computer into the phone system (with proper circuitry), but it will require someone with TTL and Modem knowledge to connect properly. Please be sure to include postage and insurance when ordering DCTAU. Shipping wgt is 20 lbs.

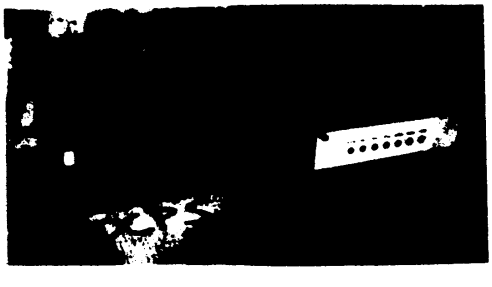
Complete - MODEM System and Documentation - ~~$45.00~~ $35.00 DCTAU

NOTE: These units can also be used for interfacing your computer to a standard audio tape recorder.

Cat. #DCPS - +5, +12, -12 - Power Supply

This is a new or slightly used small power supply ideal for TTL or MOS systems. It actually contains three separate, highly regulated supplies at +5 volts at 5 amps, +12 volts and -12 volts at about 2.5 amps each. Each supply can be remote sensed, and a large SCR crowbar protection circuit is provided. A copy of the schematic diagram is furnished with each supply. The unit is 11" X 6.5" X 5.8", weighs 15 lbs., and contains 22 transistors, 15 diodes, 58 resistors, 15 capacitors, along with other components. Input is 115v. 60 Hz. line voltage. Power supplies are adjustable as below with internal pots:

Volts	Current Amps	Adjustment range (volts)
+5	5	4.5 to 7.0
+12	2.5	10 to 14
-12	2.5	-10 to -14



DCPS DCTAU

These supplies seem to us to be ideal for MOS/LSI and TTL computer circuitry. Also they can be used to power the MODEM units above, part of the CES magnetic tape units sold previously by us, and many other systems. (over)

Cat. #DCPS - +5, +12, -12 - Power Supply (Cont'd)
Shipping weight is 25 lbs. The unit comes in a sturdy cadmium plated steel case which can be opened for easy maintenance. Complete Power Supply and Schematic: ~~$45.00~~ $35.00 DCPS

Cat. #ICV - 7400 SERIES TTL REJECTS

ICV1 - These are bulk 7400 Series Reject IC's in DIP-14 and DIP-16 packages. All are bent leads, most are marked and dated. There are quite a few bad IC's in these lots, but there are also a large number of usable devices. Shipping weight is 4 lbs.
1000 - 7400 Series TTL Rejects for $15.00 ICV1

ICV2 - These are sorted versions of the above reject IC's.
ICV2.1 - 7400 at 2¢ ea. ICV2.3 - 7410 at 2¢ ea. ICV2.5 - 7474 at 4¢ ea.

[redacted]

NOTE: These units in ICV1 and ICV2 are rejects and are not guaranteed by us. U-test-'em!!

Cat. #ICU - Bulk TTL IC'S

As advertised in Cat. #5 - mixed good/reject/etc. IC's. 1000 IC's in a bag, with spec. sheets. Shipping weight 3 lbs. per bag. New price is ~~$20.00~~ $10.00 per bag of 1000

Cat. #ICT - 74S181 ARITHMETIC UNITS - HIGH SPEED

These are guaranteed, good units, ceramic DIP-24 packages. $2.50 each ICT

Cat. #ICV - SLA-7 - LED READOUT - OPCOA - RED

These are guaranteed, good units. 7 SEGMENT, RED, SIMILAR TO MAN-1 $2.50 each ICV

Cat. #DCAG - COMPUTER KEY SWITCHES

New, chrome plated key switches with 2 keys. These are 11/16" in diameter and 1½" long. Weight is 1 oz. New. ~~$2.50~~ $1.50 each DCAG

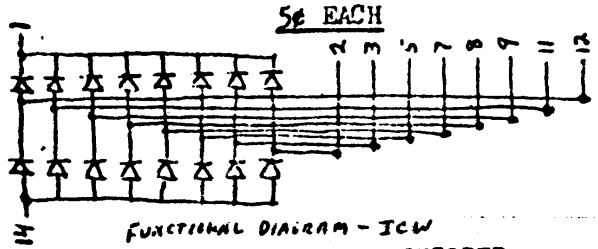
Cat. #DCCC - #30 COMPUTER WIRE - KYNAR BLUE - SILVER PLATE - see Cat. #5.

1000 ft. for $10. ; 5000 ft. for $40. ; 20,000 ft. for $140. DCCC

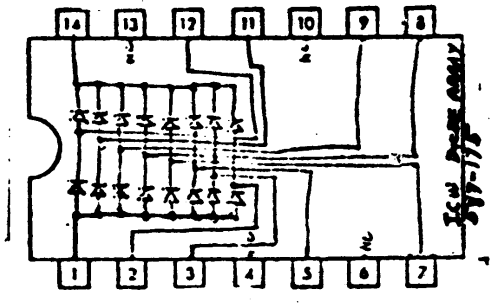
Cat. #ICW - DIODE ARRAYS - ANDEX 587-175

These are new, tested, guaranteed units in ceramic DIP-14 packages. They contain 16 diodes in a highly usable array (see diagram). These units are very useful for memory plane diode decoders, multiplexer arrays for calculators, LED display dropping diodes, logic enhancement arrays, and many other uses. These units are a steal at 5¢ each, guaranteed good.

5¢ EACH



FUNCTIONAL DIAGRAM - ICW



DIP-14 BASIC DIAGRAM

ICW Arrays at 5¢ each ICW

[redacted]

Cat. #DCAI - AUGAT WIRE WRAP BOARDS

These are used PCS-30 boards in groups of 1, 2, 3, 4, 5, or 6 units, each having 30 - DIP-14, gold plated, wire wrap, IC locations. The boards are wrapped and in excellent condition. Weight is ½ lb. per section. Powered on pins 1 and 8.
~~$5~~ $4 per section of 30 ; ~~$25~~ $20 for board of 180 locations

Cat. #ICC, ICD, ICA, etc. - High speed TTL IC's are still available from Cat. #5 at 5¢ for gates and 9¢ for flip flops and are guaranteed good. Spec sheets included.

MICRO-8 NEWSLETTER

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A newsletter dedicated to the interaction and dissimination of information to computer enthusiasts involved in the construction, programming, and applications of MICROCOMPUTER SYSTEMS.

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VOLUME 1, NUMBER 5

FEBRUARY 8, 1975

MICRO-8 COMPUTER USER GROUP NEWSLETTER FEB. 8, 1975
HAL SINGER & JOHN CRAIG - EDITORS VOLUME 1, NO. 5
CABRILLO COMPUTER CENTER
4350 CONSTELLATION ROAD
LOMPOC, CA 93436
PHONE 805-733-3501 (1:40-4:30 PST)
805-735-1596 (EVENINGS)

DO WE HAVE SOME EXCITING NEWS FOR YOU THIS TIME! EVERYONE'S DREAM WILL NEARLY COME TRUE WHEN THEY SEE BOB COOK'S CREED TELETYPE OFFER. JIM FRY HAS GOT 2102'S DOWN TO $5.45. 8008 PRICES CONTINUE TO DROP. (COOK HAS THEM FOR $45.) THE MIL MONITOR-8 ROM & CASSETTE UNIT ARE MAJOR BREAKTHRUS FOR THE HOBBYIST, AND THE DIGITAL GROUP HAS AN EXCITING DOCUMENTATION PACKAGE THEY ARE OFFERING THAT INCLUDES A CASSETTE TAPE UNIT THAT WORKS AND A $80 TV TYPEWRITER UNIT. ITS AN EXCITING TIME TO BE WORKING IN HOBBY ELECTRONICS BUT FRUSTRATING TOO SINCE THINGS CHANGE SO DARN FAST. WE NOW HAVE 400 PARTICIPANTS & SEVERAL NEW LETTERS ARRIVE EVERY DAY.

SINCE MANY PEOPLE WILL SOON BE EXPERIMENTING WITH CONFIGURATIONS OTHER THAN THE MARK-8, WE ARE SWITCHING BACK TO THE NAME "MICRO-8 COMPUTER USER GROUP." JOHN CRAIG, PRESENTLY WITH VARIAN, WILL BE HELPING ME AS A CO-EDITOR. HE PREPARED PART OF THIS NEWSLETTER.

IT'S TIME TO MAKE A DECISION ON WHAT TO DO WITH THE NEWSLETTER FOR THE FUTURE. SEVERAL POSSIBILITIES HAVE COME UP BUT NOTHING THAT WE CAN REALLY COUNT ON. BOB ALBRECHT, THRU PCC, WOULD LIKE TO START A HOBBY COMPUTER NEWSPAPER IN THE FALL. WE HAVE SEVERAL REGIONAL GROUPS THAT COULD PROBABLY BE PERSUADED TO PUBLISH AT LEAST A FEW NEWSLETTER ISSUES.

NOTHING HOWEVER HAS COME UP THAT I AM WILLING TO GAMBLE THE INTERESTS OF THE PARTICIPANTS ON. ALMOST UNANIMOUSLY, PARTICIPANTS AGREE THAT A SUBSCRIPTION NEWSLETTER IS NECESSARY. JUDGING FROM THE VERY GENEROUS DONATIONS THAT KEEP ARRIVING DAILY, WE MUST BE DOING SOMETHING RIGHT. THEREFORE THE FOLLOWING DECISION HAS BEEN MADE.

WE WILL CONTINUE TO PUBLISH 6 MORE NEWSLETTERS IN THE NEXT 6 TO 12 MONTHS FOR A FEE OF $6.00. A SERIOUS ATTEMPT WILL BE MADE TO HAVE THEM OFFSET PRINTED AND WE WILL INVESTIGATE A NON-PROFIT BULK MAILING PERMIT. I RELUCTANTLY PROPOSE THE $6.00 FEE BUT WITH PAPER AND PRINTING COSTS AS HIGH AS THEY ARE, IT WILL PROBABLY COST NEARLY THAT TO PUBLISH THE NEXT 6 ISSUES. I WOULD LIKE TO HAVE A FEW DOLLARS LEFT OVER TO HELP CONSTRUCT PERIPHERALS FOR THE CABRILLO COMPUTER CENTER'S 8008 SYSTEM TO HELP COMPENSATE THE ADVANCED STUDENTS THAT HAVE HELPED MAKE THE NEWSLETTER POSSIBLE.

MANY THANKS TO THOSE THAT HAVE SENT IN GENEROUS DONATIONS. WE HAVE KEPT CAREFULL RECORDS OF DONATIONS AND PUBLISHING COSTS AND WE WILL ONLY BE ABOUT $50 OR $60 IN THE HOLE AFTER THIS ISSUE. IF YOU HAVE ALREADY DONATED $6.00 OR MORE, PLEASE NOTE IT ON THE RENEWAL FORM. YOUR SUBSCRIPTION IS ALREADY PAID AND MANY THANKS FOR HELPING PAY FOR POSTAGE AND PAPER FOR THE PAST ISSUES.

PLEASE REMEMBER THAT THIS IS A NEWSLETTER. THAT MEANS WE DEPEND ON YOU!!! TO SEND INFORMATION THAT MIGHT INTEREST OTHERS. IF EVERYONE TAKES JUST A LITTLE EXTRA TIME TO WRITE UP WHAT THEY ARE DOING, THE NEWSLETTER WILL CONTINUE TO BE INTERESTING AND VALUABLE. IF YOU CAN SEND CAMERA READY WRITEUPS, PROGRAM LISTINGS, AND SCHEMATICS, WE WILL BE ABLE TO PUBLISH MUCH MORE MATERIAL THAN IF WE HAVE TO RETYPE AND REDRAW EVERYTHING. PARTICIPANTS MUST BE COMPLIMENTED ON THEIR WILLINGNESS TO SUPPLY MATERIAL SO FAR. YOU HAVE KEPT OUR MAILBOX FULL AND HAVE HELPED MAKE THE NEWSLETTER VALUABLE AND INTERESTING.

WE COULD EASILY DO 80 PAGES THIS TIME WITH THE MATERIAL WE HAVE IF WE COULD JUST FIGURE OUT HOW TO PRINT IT AND PAY POSTAGE. PLEASE DON'T BE UPSET IF SOME GOOD STUFF YOU SENT IN DOESN'T MAKE IT INTO THIS ISSUE. WE'LL GET IT INTO THE NEXT ONE FOR SURE. A LOT OF ITEMS TO BE MENTIONED ARE TOO BIG TO PUBLISH IN THE NL SO WE ARE PROPOSING A SUBTLE BRIBE. SEND US A NEWSLETTER ARTICLE AND A SASE, AND WE'LL SUPPLY THE REPRINT YOU REQUEST.

WILCOX ENTERPRISES
28 W 178 39TH ST.
NAPERVILLE, ILL. 60540

312-357-3021

CREED model 75 teletype with interface kit, includes crate
FOB Naperville, Ill. See over for description. $125.00
Carriage return and run out(repeat) key option on above,add 5.00
Set of original maintenance manuals on microfiche available soon
(For loan of originals write for information)
New type characters for Creed available soon
Lamp and photocell with mounting bracket for counting the number of Creed punch operations 1.00
Paper tape winder(wind up) and 2 plastic reels 5.00
Paper tape per reel .30
per box of 10 2.50
Power distribution box - includes 3 wire cord, six outlets and switch in metal box. Wonderful for work bench. 5.00
Creed Manual (may be credited to later purchase of Creed). 1.00

Optical Scanner for use with bar codes. Originally used with Creed in Spiegel system to generate teletype code. Has a variety of switches, motors, lens, photocell, power cord, etc.
Includes some descriptive material. good condition $10.00
damaged 5.00

Integrated Circuits (all prime, obtained from Intel or MIL distributors unless noted otherwise)
8008 - 8 bit Microcomputer chip $45.00
with Creed 40.00
1702 - 256 x 8 Programmable and erasable Read Only Memory 35.00
with Creed 30.00
(programmed with Creed monitor for free)
2102 - 1K x 1 RAM - Static 6.00
8 with Creed 45.00
1101 - Manufactured for United. Fully tested. 1.50

Radio Electronics 1101 memory board with 32 - United 1101's 55.00

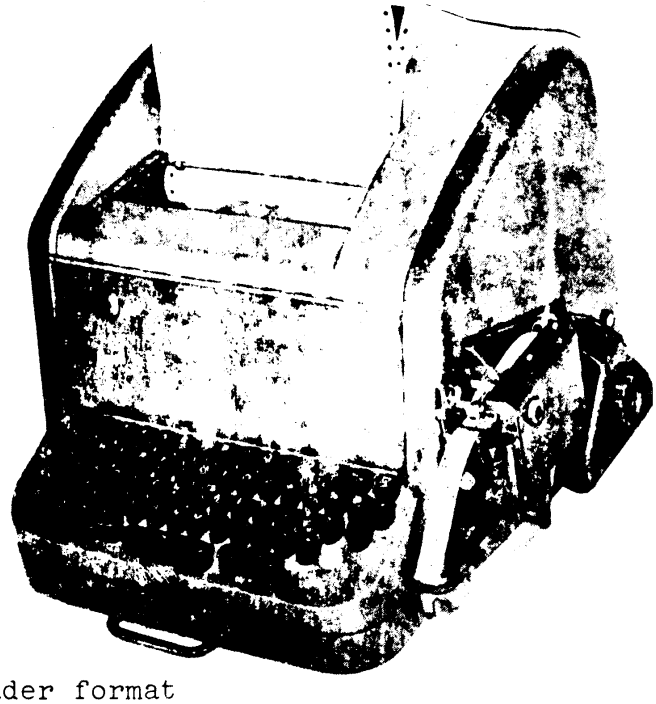
Wire wrap boards - Wrapped, used, bypass capacitors included.
14 - 16 pin sockets and 21 - 14 pin sockets 10.00

Transformers , two secondaries 27 v and 7 v, appear to be high current 4.00

Lamda power supplies - 20 v 20 a- variable from 0 to 25 v. includes current and voltage meters(rack mountable) 60.00
20v 12 a - variable from 0 to 25 v. no meters 40.00
Rixon multiplexer circuit packs and mounting hardware. Write for full information. Circuit packs include teletype speed converters, clocks, small power supplies, modems, etc.

RWC 1-26-75

ITT CREED MODEL 75 TELETYPE



COMPLETE WITH INTERFACE KIT AND PROGRAMS FOR 8008

Table model with shock mounted rubber feet. Weighs 55 lb.

Uses 5 bit Baudot code, fractions set.

Manufactured for Spiegel about 1964.

Programs included(available on 1702):

1. Convert to and from 6 bit code or ASCII
2. Monitor program to load (octal keyboard) or display memory.
3. Loader from 5 bit serial device (paper tape reader or cassette)
4. Paper tape or cassette dump in loader format

KEYBOARD - Includes 29 keys in 3 rows (not as shown above), some available with repeat key and carriage return. The keyboard is mechanically linked to the printer so that it can be used locally without a loop supply

PRINTER - A cylindrical type head gives high quality printing and allows individual characters to be replaced. Both single or multiple copy and pin or friction feed are selectable by levers. There are 71 characters per line and standard 8 1/2 inch wide paper is used.

PAPER TAPE PUNCH - A reel of tape is held in a disappearing drawer below the keyboard and there is a low tape warning light. Punching is suppressed on 5 control characters, but instructions are included to remove the suppression. A full reel of 11/16 inch tape is included.

NO TAPE READER

MISCELLANEOUS FEATURES

1. Message sender drum is activated by a solenoid and sends 20 characters as determined by bars in the drum.
2. Fast form feed solenoid (kit does not include driver for this solenoid as it is unnecessary in most applications).
3. Digital operations counter for maintenance logging.
4. Manual carriage return key above keyboard.
5. Start key above keyboard (not shown above) brought out to contacts.
6. Blank tape key above keyboard.

ELECTRICAL INTERFACE - Serial to printer (polar 24 v solenoids) and parallel from keyboard (instructions included for rewiring for serial from keyboard for other applications). Punch suppress, print suppress, and message sender solenoids. 10 characters per sec., 7 1/2 bit code, and 13 1/3 millisecond bit time.

INTERFACE KIT - Includes manual, program listings, power supply for solenoids, drivers for solenoids and input interface. Requires 5 v. from processor for 7406 driver, 1 input port (port 0) and 1 or 2 out ports (11 and 12).

Warranty : To arrive in working order. Free parts for 1 year as necessary.

RWC 1-26-75

HOW TO GET RELIABLE HARD COPY PRINTOUT FOR $125

BOB COOK, WILCOX ENTERPRISES, 25 W 178 39TH ST., NAPERVILLE, IL 60540, PROVIDED US WITH WHAT I THINK IS THE MOST EXCITING INFORMATION TO HIT THE HOBBY COMPUTER GROUP YET. ENCLOSED IS A FLYER OFFERING CREED TTY'S MANUFACTURED IN ENGLAND BY A SUBSIDARY OF IT&T IN 1964 FOR A SPECIALIZED ORDER PROCESSING SYSTEM USED BY SPIEGAL.

BOB HAS DONE A BEAUTIFUL JOB OF PREPARING HIS FLYER AND IT WILL TAKE MANY RE-READINGS BEFORE YOU APPRECIATE ALL OF THE FEATURES THESE OFFER. HE ALSO PROVIDES A MARK-8 INTERFACE KIT WITH THE UNIT SO THAT THE BUYER WILL KNOW EXACTLY HOW TO GET THE UNIT RUNNING, HAS PROM'S AVAILABLE WITH A KEYBOARD MONITOR DESCRIBED BELOW, AND WILL SUPPLY FREE PARTS FOR 1 YEAR SO THAT YOU CAN KEEP THEM RUNNING. HE ALSO HAS SERVICE DOCUMENTATION AVAILABLE AND SELLS EACH UNIT WITH A DETAILED MANUAL.

A REASONABLY QUIET AND MODERN, 10 CPS, HARD COPY DEVICE AND KEYBOARD WITH A PAPER TAPE PUNCH AS A BONUS FOR $125. THAT HAS TO BE A DREAM COME TRUE FOR THE MARK-8 PARTICIPANT. TO MAKE THE OFFER SEEM EVEN BETTER, CIRCUITS AND PROMS WILL SOON BE AVAILABLE FOR USING THE CREEDS WITH THE MIL MONITOR-8 DESCRIBED IN THE NEXT SECTION.

IT LOOKS LIKE I WILL HAVE TO MAKE GOOD ON MY PROMISE FOR A CONSTRUCTION ARTICLE ON A $35 PAPER TAPE READER. MR. TITUS SAYS HE BUILT ONE USING A LEDEX STEPPING SWITCH DRIVE. MAYBE WE CAN GET HIM TO SUPPLY MORE DETAILS.

BOB HAS SEVERAL HUNDRED OF THESE UNITS AVAILABLE SO IT WILL UNDOUBTEDLY BECOME THE STANDARD MARK-8 USER'S HARD COPY DEVICE. HE WOULD LIKE TO SEE THE MIL MONITOR BECOME THE STANDARD ALSO.

THE CREED I/O FORMAT IS AS FOLLOWS:

```
  IN0                                OUT11
BIT 0  UNUSED                     BIT 0  SERIAL OUT TO PRINTER, PUNCH,
    1  D0     CREED                      CASSETTE, ETC.
    2  D1     PARALLEL                 1-7 UNUSED
    3  D2     KEYBOARD OUT
    4  D3
    5  D4                          OUT13
    6  STROBE KEYBOARD           BIT 0  UNUSED
    7  SERIAL IN PAPERTAPE           1  PUNCH INHIBIT
                                     2  PRINT INHIBIT
                                     3  MESSAGE SENDER
                                    4-7 UNUSED
```

THE CREED BAUDOT LOADER TAPE FORMAT -- 5 BIT TAPE

```
    B------BBL L H H D D ----------D D BBBBBBBBBBB
HEADER        L H L H L H             L H      TRAILER
    B MEANS BLANK TAPE
```

L_L - LOW 4 BITS OF LOW 8 BITS OF LOAD ADDRESS

L_H - HI

H_L - LOW 4 BITS OF HI 8 BITS OF LOAD ADDRESS

H_H - HI

D_L - LOW 4 BIT OF DATA WORD

D_H - HI

THE HIGH ORDER BIT OF EACH 5 BIT WORD IS IGNORED, EXCEPT IN LOOKING FOR BLANK HEADER AND BLANK TRAILER, I.E. THE 5TH BIT MAY BE 1 OR 0 EXCEPT THAT 0000 MUST BE 10000 RATHER THAN 00000.

THE CREED MONITOR--FUNCTIONS AND CONTROL CHARACTERS

B REPRESENTS THE LAST THREE DIGITS TYPED.

- H - PUT B IN H
- L - PUT B IN L
- Z - PUT B IN MEMORY
- S - PUT H:L IN 'START ADDRESS'
- N - PUT H:L IN 'END ADDRESS'
- X - CALL 'START ADDRESS'
- 0 - LOAD MEMORY FROM TAPE, PUT FIRST ADDRESS IN START ADDRESS

I - INCREMENT H:L
D - DECREMENT H:L
M - DUMP MEMORY FROM 'START ADDRESS TO END ADDRESS AS A LOADER TAPE
A - L TO LIGHTS
B - H TO LIGHTS
C - MEMORY AT H:L TO LIGHTS
Ø - 7 - SHIFT B LEFT 3 BITS AND INSERT IN LOW 3 BITS
COMING - PRINT H:L:MEMORY IN OCTAL

THE MIL MOD-8, MONITOR-8, CHEAP MEMORY, AND A CASSETTE TAPE THAT WORKS!

EVER SINCE PEOPLE FIRST DISCOVERED THE MICROSYSTEMS INTERNATIONAL (MIL) MOD-8 CONFIGURATION, IT HAS STARTED TO LOOK BETTER AND BETTER. (SEND THE MIL CARD IN AND YOU WILL RECEIVE AN MF8ØØ8 BOOK WITH CIRCUITS AND PC BOARD LAYOUTS FOR THE MOD-8 AND A DESCRIPTION AND LISTING OF MONITOR-8.) THE MOD-8 BOARDS ARE AVAILABLE PRESENTLY FROM CANADA FOR ABOUT $12Ø AND WE HAVE PERMISSION TO HAVE THEM CUSTOM ETCHED FOR US. ROBERT SWARTZ, 195 IVY LANE, HIGHLAND PARK, IL 6ØØ35, HAS HIS MOD-8 RUNNING AND IS VERY IMPRESSED WITH THE DESIGN AND QUALITY OF THE BOARDS AND THE TOTAL SYSTEM. IT CAN ALSO BE EXPANDED TO AN 8Ø8Ø SYSTEM BY CHANGING A COUPLE OF BOARDS WHICH WILL BE MADE AVAILABLE.

WITH THE ANNOUNCEMENT THAT MONITOR-8 WOULD SOON BE AVAILABLE IN A MASK PROGRAMMED ROM, THINGS REALLY GOT EXCITING. NOW WE HAVE A COPY OF MIL'S CASSETTE LOAD AND DUMP CIRCUIT AND ARE TOLD THAT THE ROM MONITOR-8 WILL INCLUDE CASSETTE LOAD AND DUMP ROUTINES. I'M ESTACTIC!

MANY PARTICIPANTS MAY NOT HAVE RECEIVED THE MF8ØØ8 MANUAL SO WE HAD BETTER FIRST EXPLAIN WHAT MONITOR-8 IS. IT'S A 2K BYTE PROGRAM THAT ALLOWS YOU TO: 1) INTERRUPT RESTART DIRECTLY TO TTY CONTROL. (WHO NEEDS A FRONT PANEL?) 2) SET THE CURRENT LOCATION POINTER FROM THE TTY. (ALL DATA ENTRY AND MANIPULATION IS DONE AT THIS ADDRESS AND IT IS UPDATED TO POINT AT THE NEXT MEMORY ADDRESS AFTER EACH OPERATION.) 3) DISPLAY THE CURRENT LOCATION POINTER ON THE TTY. 4) DUMP SYMBOLIC (TYPES OUT THE MNEUMONIC CONTENTS OF MEMORY LOCATIONS BETWEEN TWO MEMORY LIMITS.) 5) LOAD A SECTION OF MEMORY FROM TTY IN OCTAL. 6) DUMP A SECTION OF MEMORY ON TTY IN OCTAL. 7) LOAD A SECTION OF MEMORY FROM TTY IN BNPF FORMAT. 8) DUMP A SECTION OF MEMORY IN BNPF FORMAT. (USEFUL FOR ROM PROGRAMMING.) 9) LOAD A SECTION OF MEMORY WITH INSTRUCTIONS TYPED IN MNEUMONIC FORM. 1Ø) START A PROGRAM AT A TYPED STARTING LOCATION. 11) COPY A PROGRAM FROM ONE SECTION OF MEMORY TO ANOTHER. 12) TRANSLATE A PROGRAM SO THAT MEMORY REFERENCES ARE ADJUSTED SO THAT IT WOULD RUN AT A NEW LOCATION IF COPIED. 13) SET A BREAKPOINT. (WHEN A RUNNING PROGRAM REACHES THIS LOCATION, IT TYPES OUT THE CONTENTS OF THE CARRY FLAG, THE A, B, C, L, & H REGISTERS AND THE CONTENT OF MEMORY POINTED TO BY L & H, AND RETURNS CONTROL TO MONITOR-8. 14) CLEAR THE BREAK POINT. 15) PROGRAM 17Ø2 PROM'S. 16) DUMP A SECTION OF MEMORY ONTO A CASSETTE. 17) LOAD A SECTION OF MEMORY FROM CASSETTE. 18) VERIFY THE CONTENTS OF A CASSETTE AGAINST MEMORY.

NOW THE GREAT NEWS! MAURY GOLDBURG, CELITRON COMMUNICATIONS CORP., 1618 JAMES ST., SYRACUSE, NY 13203 315-422-4467, (ALSO M&R ENTERPRISES, PO BOX 1Ø11, SUNNYVALE, CA 94Ø88.) IS GOING TO BE ABLE TO SUPPLY THIS MONITOR-8 ROM AND ALTHOUGH THE PRICE IS NOT FIRM, HE THINKS HE CAN SUPPLY IT FOR ABOUT $5Ø AND HE SHOULD BE ABLE TO SUPPLY A PC BOARD FOR THE INTERFACE SOON ALSO. TWO K OF MEMORY FOR $5Ø IN ONE EASY TO WIRE IN PACKAGE WITH ALL OF THAT CAPABILITY, AND AS A BONUS, 35 OR SO INTERNAL SUBROUTINES THAT YOU CAN USE FOR YOUR OWN PROGRAMMING! WOW!!!! THE GOOD NEWS ISN'T OVER YET. THE CHICAGO GROUP IS WORKING ON A HARDWARE MODIFICATION THAT ALLOWS THE CREED TTY'S THAT BOB COOK CAN SUPPLY (OR ANY 5 LEVEL BAUDOT TTY) TO OPERATE WITH THIS MONITOR.

NOW SOME DETAILS ON THE CASSETTE INTERFACE. AN EXTREME CONDENSATION OF MIL'S WRITEUP FOLLOWS:

PAUL MORK'S MUSIC PROGRAM (YOU'LL JUST HAVE TO TRY THIS ONE!)

INSTRUCTIONS: LOAD PROGRAM AT MEMORY LOCATIONS 00000 TO 00050.
LOAD DATA STARTING AT MEMORY LOCATION 00060.
CONNECT AMPLIFIER AUXILLARY INPUT THRU A 1 MFD CAPACITOR TO ANY LINE ON OUTPUT B. CONNECT COMPUTER AND AMP. GROUNDS TOGETHER.
START PROGRAM WITH RESTART 005.
PROGRAM STOPS AT END OF TUNE.
(IF YOU WANT TO KNOW WHAT TUNE IS PROGRAMMED HERE, YOU'LL JUST HAVE TO TRY IT FOR YOURSELF.)

```
00000/  LLI (066)
        060
        LHI (056)
        000
        LDI (036)
        012
        DCB (011)
        CTZ (152)
00010/  021
        000
        DCC (021)
        JFZ (110)
        006
        000
        JMP (104)
        026
00020/  000
        XRI (054)
        377
        OUT B (125)
        LBM (317)
        RET (007)
        DCD 8031)
        JFZ (110)
00030/  006
        000
        INL (060)
        LDA (330)
        LAM (307)
        CPI (034)
        377
        LAD (303)
00040/  JTZ (150)
        050
        000
        LDI (036)
        012
        JMP (104)
        006
        000
00050/  HLT (000)

00060/  037
        037
        037
        045
        045
        045
        057
        057
00070/  057
        077
        077
        077
        070
        061
        057
        070
00100/  070
        057
        077
        077
        077
        077
        077
        077
00110/  051
        051
        051
        037
        037
        037
        045
        045
00120/  045
        057
        057
        057
        070
        061
        057
        051
00130/  051
        045
        051
        051
        051
        051
        051
        045

00140/  043
        045
        051
        037
        037
        045
        051
        057
00150/  057
        057
        057
        051
        045
        045
        057
        070
00160/  070
        057
        070
        077
        077
        077
        077
        077
00170/  077//57
        057
        045
        051
        051
        077
        057
        057
00200/  045
        051
        045
        043
        037
        045
        057
        051
00210/  051
        077
        057
        057
        057
        057
        377
```

WRITE YOUR OWN MUSIC. DATA IS AT LOCATIONS 00044 AND 00005 CONTROLS TEMPO. DATA STARTING AT 00060 IS MUSIC, 1 BEAT PER WORD. LOAD NOTES AS FOLLOWS. 377 STOPS PROGRAM. C=027, B=030, A=033, G=037, F=043 E=045, D=051, C=057, B=061, A=070, G=077.

Appendix B

Memory Diagnostic Program
by
James E. Maddie

Program loads memory address into memory location then checks for error. For a random test pattern: 1.) Put pattern in loc. 5 2.) Change loc. 6 to 373 3.) Change loc. 14 to 271.

Location	Instruction		Comment
0	056	LHI	
1	PPP	PPP	Page under test (not same page that prog is loaded)
2	066	LLI	
3	000	000	
4	016	LBI	
5	TTT	TTT	Test Pattern
6	376	LML	Write into memory
7	060	INL	
10	110	JFC	Continue if page not filled
11	006	006	
12	000	000	
13	307	LAM	Read from memory
14	276	CML	Compare with pattern
15	110	JFC	Jump if different
16	027	027	
17	000	000	
20	060	INL	
21	110	JFC	Continue if page not completely checked
22	013	013	
23	000	000	
24	104	JMP	Do it again
25	000	000	
26	000	000	
27	121	OUTO	Output wrong pattern read from mem
30	000	HLT	
31	306	LAL	
32	121	OUTO	Output address of error
33	000	HLT	
34	104	JMP	Continue
35	020	020	
36	000	000	

JOHN HOPKIN'S RANDOM NUMBER GENERATION ALGORITHM (LEHMER METHOD)

TAKE AN EIGHT DIGIT NUMBER (SAY 12345678), MULTIPLY BY 23 WHICH GIVES 028395094. THE NINTH AND TENTH DIGITS FROM THE RIGHT ARE TAKEN OFF AND TREATED AS ONE 2 DIGIT NUMBER WHICH IS SUBTRACTED FROM THE REMAINING EIGHT DIGIT NUMBER. (12345678 X 23 = 0283950594 83950594 - 02 = 83950592) THIS GIVES YOU EIGHT RANDOM DIGITS BETWEEN 0 AND 9. THE SERIES REPEATS ITSELF AFTER 5,882,352 ITERATIONS LEAVING YOU WITH ABOUT 47 MILLION RANDOM DIGITS. ONLY THE LAST EIGHT COMPUTED RANDOM DIGITS NEED BE STORED IN MEMORY AND RECOMPUTATION WILL GIVE A NEW SET WHICH CAN BE STORED BACK IN MEMORY. HERE ARE A FEW ITERATIONS: (1234 5678 0592 3086 3597 0986 2724 2684 2650, ETC.) THIS SHOULD WORK NICELY WITH ONE OF THE CALCULATOR INTERFACES THAT SEVERAL PEOPLE ARE WORKING ON.

WITH THE INCREASING USE OF MICROPROCESSORS, THERE IS A GROWING NEED FOR LOW COST MEMORY DEVICES. THIS NEED CAN BE MET BY USING A LOW COST AUDIO CASSETTE UNIT TO STORE DATA. OFFERING 330 BAUD (BITS PER SECOND) WITH 1 BIT PER 1 MILLION ERROR RATE USING A LOW COST REUSABLE AUDIO CASSETTE AND A MEDIUM QUALITY RECORDER AS THE STORAGE MEDIUM, THE COMPLETE SYSTEM IS AN ATTRACTIVE ALTERNATIVE TO THE TELETYPE PAPER TAPE APPROACH.

THE TWO POPULAR CASSETTE RECORDING METHODS ARE FSK (FREQUENCY SHIFT KEYING) AND TONE BURST RECORDING. WITH THE FSK SYSTEM, TEMPORARY LOSS OF SIGNAL DUE TO TAPE IMPERFECTIONS AND THE TAPE "BUMPING AGAINST THE HEAD WILL CASE THE PLL TO LOSE TRACK OF INPUT FREQUENCIES AND THE REQUIRED RELOCKING OF THE PLL MAY REQUIRE SEVERAL BIT TIMES. FURTHERMORE, WOW AND TAPE FLUTTER WILL CAUSE FREQUENCY SHIFTS WHICH COULD BE INTERPRETED AS DATA BIT TRANSITIONS. THE TONE BURST TECHNIQUE BEGINS TO FAIL ABOVE THE 200 BAUD LEVELS AND WITH AUTOMATIC LEVEL CONTROLS (ALC) USE IN MOST CASSETTE UNITS WHICH ADJUST THE RECORDING AMPLIFIERS TO COMPENSATE FOR SIGNAL LEVEL VARIATIONS, THE NO-TONE STATE WILL CAUSE THE GAIN TO BE MAXIMUM WHICH RESULTS IN UNBEARABLE BACKGROUND NOISE BEING RECORDED.

A HYBRID APPROACH HAS BEEN TAKEN WHICH TAKES ADVANTAGE OF THE LESS THAT 8 KHZ FREQUENCY RESPONSE OF A CASSETTE RECORDER. "1"S ARE RECORDED AS 6 KHZ AND "0'S" AS 12 KHZ (WAY ABOVE THE RESPONSE OF THE CASSETTE BUT IT ENSURES THAT THE ALC WILL NOT BOOST THE GAIN). DURING PLAYBACK, A SIMPLE CAPACITOR FILTERS OUT ANY HIGH FREQUENCY AND THE 6KHZ SIGNAL IS DIGITALLY INTEGRATED TO PROVIDE A LOGIC 1 LEVEL. THE DIGITAL INTEGRATOR WILL TRAP AFTER 1 CYCLE AND HOLD UP TO 1 CYCLE TIME THUS REDUCING PROBLEMS DUE TO DROPOUTS AND TAPE NOISE. SOFTWARE USED TO GENERATE AND RECEIVE SERIAL DATA ALSO INCLUDES PARITY CHECKING ROUTINES. FURTHERMORE, EACH BIT TIME IS DIVIDED INTO 12 EQUAL SAMPLE TIMES AND THE DATA READ ROUTINE AVERAGES THE SAMPLES DURING EACH BIT TIME (LESS THAN 6 IS A "0", MORE THAN 6 IS A "1"). THIS FURTHER REDUCES THE NUMBER OF ERRORS DUE TO TAPE NOISE AND DROPOUTS. THE RESULTING SYSTEM OPERATES VERY SATISFACTORILY AT A 330 BAUD RATE WITH AN ERROR RATE BETTER THAN 1 BIT/10^6 BITS USING A MEDIUM QUALITY AUDIO CASSETTE CARTRIDGE.

THE HARDWARE INTERFACE IS SHOWN IN APPENDIX A-1. IT USES SOME FUNNY IC'S BUT THEY ARE AVAILABLE AND A CLEVER GUY COULD EASILY CHANGE IT TO EASILY AVAILABLE IC'S. ALSO ITS 'DIGITAL' NOT 'ANALOG' WHICH IS A VERY NICE FEATURE.

THE MONITOR ROUTINE OFFERS 3 OPTIONS: 1) DUMP TO CASSETTE 2) LOAD FROM CASSETTE 3) VERIFY THAT CASSETTE DATA IS THE SAME AS MEMORY. TO UTILIZE IT, THE USER TYPES XQT 007000 AND MONITOR ACCEPTS A LOW AND HIGH MEMORY ADDRESS AND REQUESTS OPTION D/L/V. FOLLOWING THE PRINTING OF THE OPTION LIST, THE USER SHOULD START THE CASSETTE UNIT, EITHER IN PLAY OR RECORD MODE ACCORDING TO THE DESIRED FUNCTION, AND TYPE THE OPTION LETTER.

IF THE WRITE OPTION IS CHOSEN, IT WILL WAIT FOR 5 SECONDS TO ENSURE THAT THE TAPE LEADER IS PAST THE HEAD, WRITE A PREAMBLE OF 8 377 WORDS AND A SYNCH WORD OF 000. IMMEDIATELY AFTER THE 000 SYNCH WORD, MEMORY DATA IS RECORDED AS CONTINUOUS DATA WORDS. UPON COMPLETION, CONTROL IS RETURNED TO MONITOR.

THE PLAYBACK ROUTINE READS CHARACTERS UNTIL IT RECEIVES A 377 WORD AND THEN WAITS UNTIL IT RECEIVES A 000 SYNCH WORD AND THEN LOADS SUBSEQUENT DATA ITEMS. A PARITY ERROR OR A VERIFY ERROR WILL PRINT THE CARRY FLAG, CONTENTS OF A,B,C,L & H REGISTERS AND CONTENTS OF MEMORY POINTED TO BY H & L AND RETURN CONTROL TO MONITOR. THE A & B REGISTERS CONTAIN THE CASSETTE DATA AND H & L POINT TO THE CURRENT LOCATION POINTER.

THE FULL DOCUMENT IS 11 PAGES LONG AND INCLUDES THE SOFTWARE LISTING AND COPIES WILL BE SENT TO ANYONE SUPPLYING A 20 CENT SASE AND A SHORT CAMERA READY WRITEUP ON YOUR MICRO-COMPUTER PROJECT USEABLE IN THE NEXT NEWSLETTER.

MARK-8 MODS, A $80 VIDEO TERMINAL, & ANOTHER CASSETTE UNIT THAT WORKS!

THE DIGITAL GROUP, PO BOX 6528, DENVER, CO 80206 HAS AN EXCITING PACKAGE OF INFORMATION THAT WILL SOON BE AVAILABLE. THE BEST WAY TO DESCRIBE IT IS TO EXTRACT PARAGRAPHS FROM LETTERS THEY HAVE SENT:

"A GUY NAMED DR. ROBERT SUDING CALLED US ABOUT SHOWING HIS COMPLETE MARK-8 TO THOSE IN THE DENVER AREA AND ABOUT 15 SHOWED UP. DR. SUDING HAS A DOCTORATE IN SYSTEMS ANALYSIS, WORKS FOR IBM AND HIS LATEST DEVELOPMENT PROJECT IS IN GRAPHICS. HE IS ALSO ONE OF THE NATION'S LEADING DEVELOPERS OF SLOW-SCAN TV. HE HAS MADE EXTENSIVE MODS TO HIS MARK-8 INCLUDING PLUGGABLE BOARDS, OCTAL READOUT, LARGE POWER SUPPLY, & KEYBOARD DATA ENTRY. HE SPENT A 1/2 DAY DESIGNING AN FSK CASSETTE INTERFACE AFTER REJECTING OTHER CIRCUITS DUE TO DRIFT. RESUULT-- NOT ONE BIT ERROR IN OVER 2 MONTHS USING A K-MART $30 EL-CHEAPO. HIS CROWNING ACHIEVEMENT IS A TV CHARACTER GENERATOR THAT USES 1101 RAM (ALMOST INSTANTANEOUS UPDATE) AND DISPLAYS UPPER AND LOWER CASE, #'S & SYMBOLS AND THE GREEK ALPHABET AND THAT CAN BE BUILT FOR UNDER $80."

DR. SUDING SAYS, "THE 'DIGITAL GROUP' IS ASSISTING ME TO DISTRIBUTE MY IDEAS AS EASILY AND EFFICIENTLY AS POSSIBLE. IT IS AN OUTFIT WHOSE DESIRE IS MUTUAL HELP ON A BREAK-EVEN BASIS. I AM VERY ACTIVELY INVOLVED IN AMATEUR RADIO SLOW SCAN TV DESIGN AS A HOBBY AND OFTEN AVERAGE TWO LETTERS A DAY, SO THIS WAY HELP GETS OUT FAST FOR THE MARK-8. THE COST OF $7.50 IS SOLELY REIMBURSEMENT FOR EXPENSES OF REPRODUCTION, THE CASSETTE, & MAILING." INCIDENTLY, DR. SUDING ASKS THAT ALL QUESTIONS BE DIRECTED THRU THE DIGITAL GROUP TO HIM.

"A COPY OF THE CASSETTE INTERFACE CIRCUIT IS INCLUDED SO THAT THOSE INTERESTED CAN GET TO WORK ON THE CIRCUIT AND TO SERVE AS AN EXAMPLE OF WHAT THEY EXPECT THEIR ENTIRE $7.50 DOCUMENTATION PACKAGE TO LOOK LIKE. THE LATEST LIST OF SCHEMATICS AND SOFTWARE TO BE INCLUDED IN THE PACKAGE IS:

I. MARK-8 HARDWARE MODIFICATIONS
   1. FRONT PANEL OCTAL KEYBOARD AND 7 SEGEMENT READOUTS.
   2. INPUT PORT EXPANSIONS (TO 7 PORTS)
   3. OUTPUT PORT EXPANSIONS.
   4. A LARGE INEXPENSIVE POWER SUPPLY.
   5. A 4-IC CASSETTE RECORDER INTERFACE THAT WORKS! (NOT ONE BIT ERROR IN OVER 2 MONTHS ON A K-MART EL-CHEAPO.)
   6. 128 CHARACTER-SET INEXPENSIVE TV TYPEWRITER CAPABLE OF DISPLAYING 256 CHARACTERS UTILIZING 1101 RAM AND WHICH CAN BE BUILT FOR UNDER $80.
   7. A BACKPLANE WIRING CHART TO ASSIST CONVERTING THE MARK-8 TO PLUGGABLE BOARDS.
   8. A 128-CHARACTER KEYBOARD ENCODER.
   9. A PARTS LIST FOR ALL OF THE ABOVE.

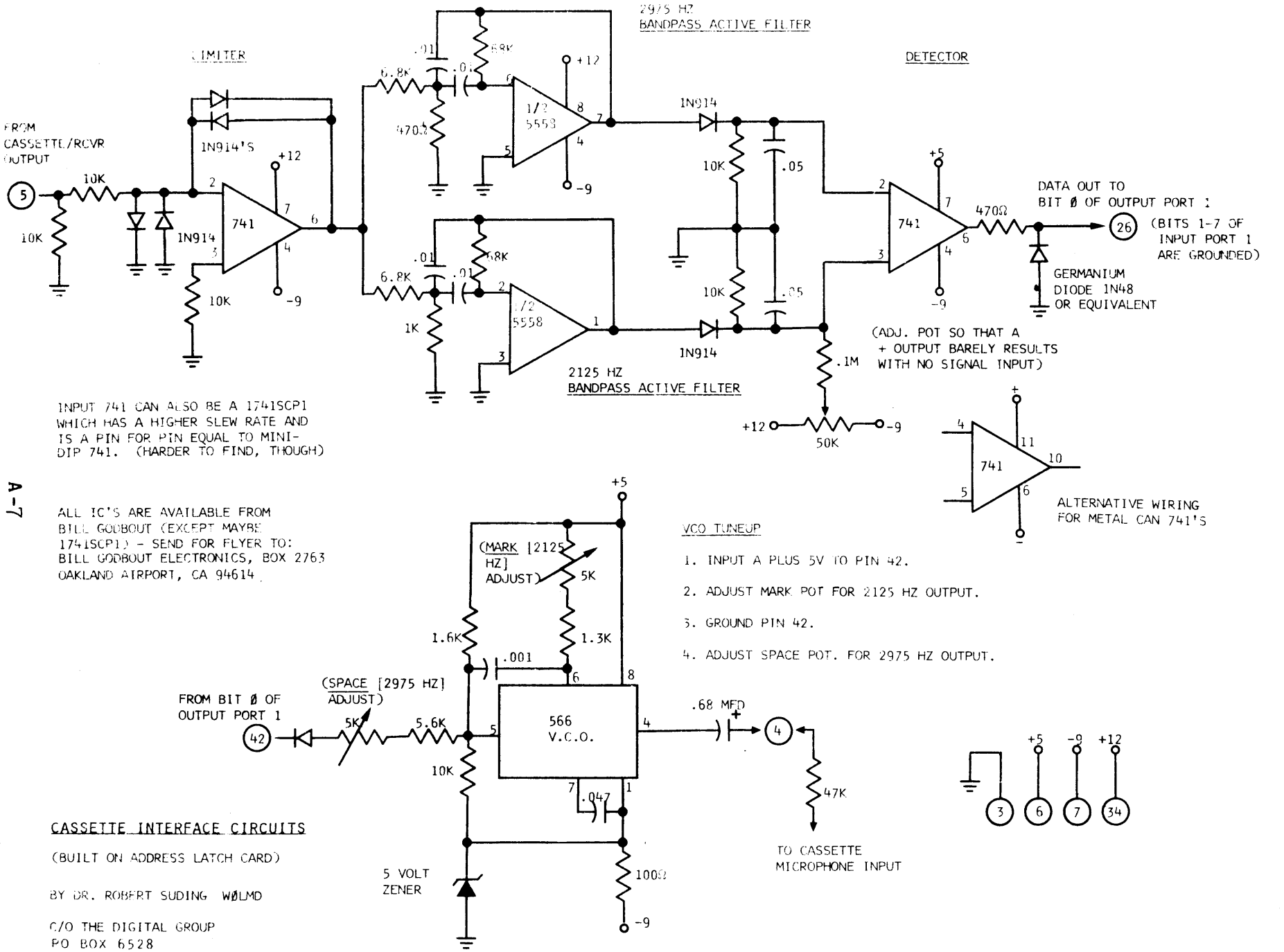
II. SUPPORTING PROGRAMS WITH DOCUMENTATION (25 PAGES).
   1. CASSETTE DUMPER (BOOTSTRAP LOADER). 2. CASSETTE LOADER
   3. MEMORY CLEAR SUBROUTINE
   4. MEMORY CHECKER (TESTS CHIPS AND IDENTIFIES BAD ONES)
   5. KEYBOARD TO MEMORY. 6. BIT REVERSE SUBROUTINE
   7. KEYBOARD PROGRAM LOADER 8. RESTART TO PROGRAMS
   9. KEYBOARD TO TV 10. TV CHARACTER GENERATOR TEST.
   11. TV CHARACTER GENERATOR DEMONSTRATION.
   12. RUNNING (RIGHT TO LEFT) TV DISPLAY.
   13. TV STORAGE DUMP 14. TV HOME ERASE SUBROUTINE
   15. TV SPACING SUBROUTINE. 16. TV CHARACTER ENTRY SUBROUTINE.

III. A CASSETTE CONTAINING ALL THE ABOVE SOFTWARE.

IV. SUPPORTING NARRATIVES AND COMMENTS THRUOUT.

THE PRICE FOR THE PACKAGE IS $7.50, DELIVERY - FIRST CLASS, DELIVERY DATE - AFTER ARRIVAL OF NEWSLETTER #5.

THERE ARE 2 MINOR CORRECTIONS TO THE CASSETTE INTEFACE SCHEMATIC ENCLOSED. 1) THE UNMARKED DIODE IN THE LOWER CIRCUIT IS A 1N914, & 2) THE ALTERNATE WIRING FOR 741'S IS FOR 14-PIN DIP 741'S.



A-7

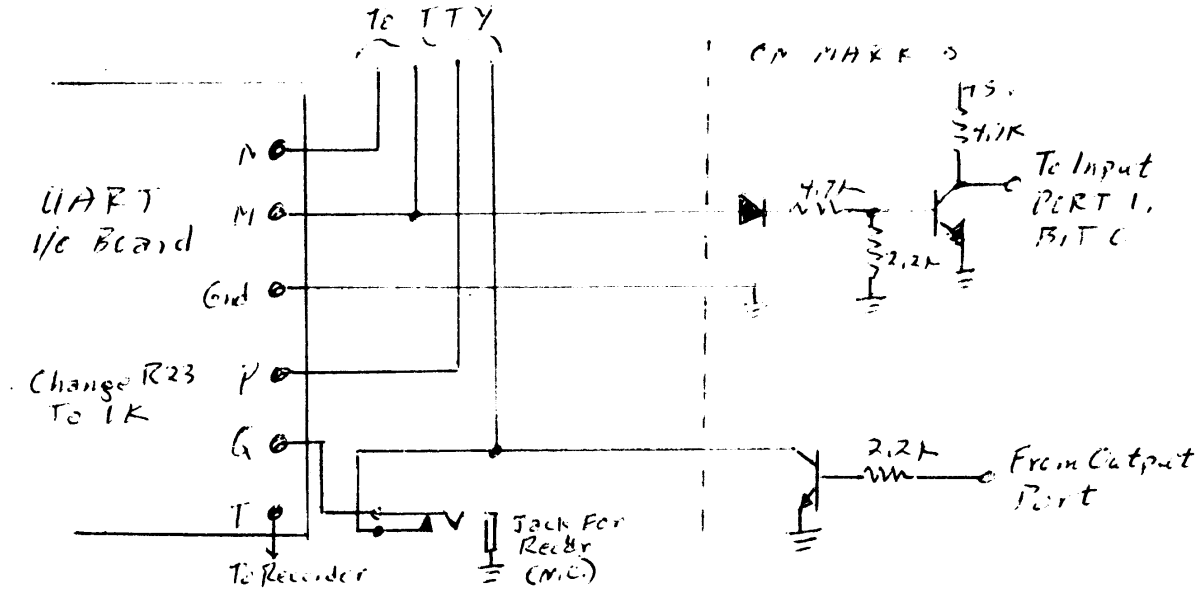
CASSETTE INTERFACE CIRCUITS

(BUILT ON ADDRESS LATCH CARD)

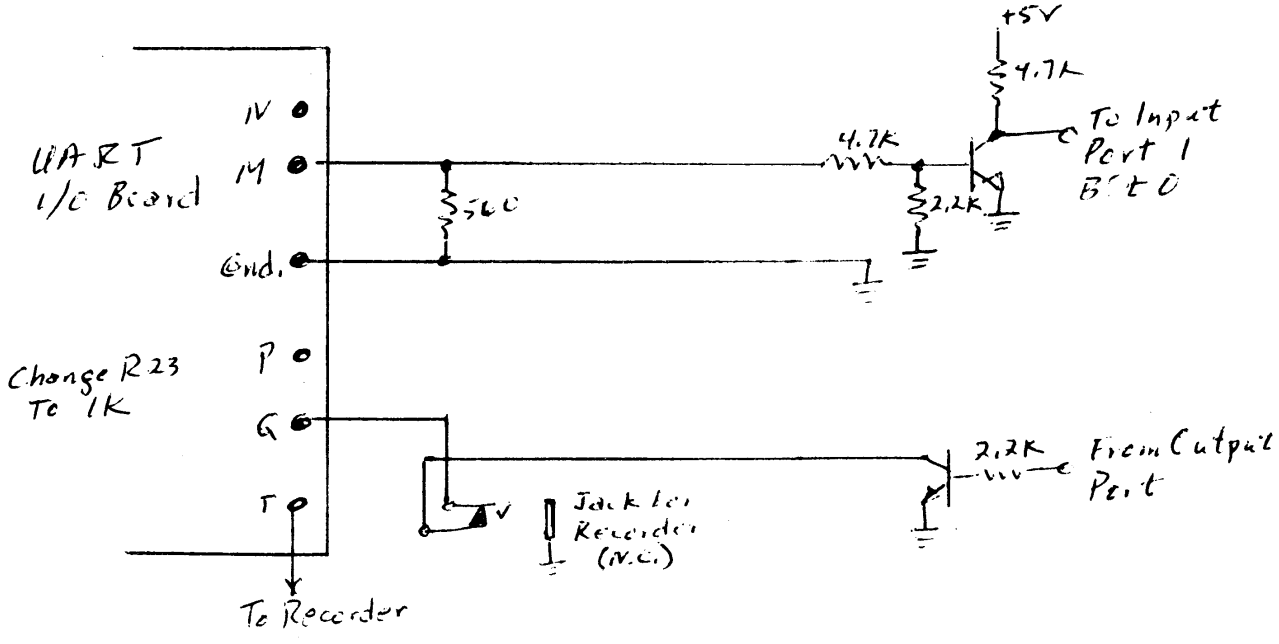
BY DR. ROBERT SUDING WØLMD

C/O THE DIGITAL GROUP
PO BOX 6528
DENVER, COLORADO 80206

Interconnection schematic to connect UART I/O board on R-2 TV Typewriter to the Mark-8 computer. By Roger Smith



Above circuit if you have TTY connected.



Above circuit if you don't have TTY

RLS 1-11-75

"WE HAVE DECIDED TO DO A DOUBLE-SIDED PC BOARD FOR THE TV CHARACTER GEN. AND SHOULD HAVE QUOTES BACK SOON. A "KIT" AND THE PC BOARD MIGHT BE AVAILABLE BY THE END OF FEBRUARY. DR. SUDING IS ALSO EXPANDING HIS CHARACTER GENERATOR TO 1000 CHARACTERS ON THE SCREEN AT A TIME. BANDWIDTH IS THE MAJOR LIMITATION, BUT HE FEELS IT WILL WORK REASONABLY WELL. (REMEMBER, TV DESIGN AND GRAPHICS ARE HIS FORTE.) IT WILL USE 2102'S AND TAKE 5 MSEC TO UPDATE THE SCREEN SO WE WILL PROBABLY HAVE TWO VERSIONS."

"DR. SUDING HAS COMPLETED AND IS OPERATING HIS HARDWARE INTERFACE FOR THE RADIO SHACK 5012 12-DIGIT CALCULATOR CHIP. IT REQUIRES LESS THAN $20 IN PARTS INCLUDING THE CHIP (ABOUT $8). HE IS NOW DEVELOPING THE SOFTWARE DRIVER ROUTINES. IT USES +5V AND +12V, 17 ICS, PORT 6 AND LOWER HALF OF PORT 7 FOR INPUT AND PORT 7 FOR OUTPUT. HIS FIRST APPLICATION WILL BE A CHECKBOOK BALANCER (WITH RECALL LOOK-UP) FOR HIS WIFE. DR. SUDING ALSO MENTIONED USING A MOSTEK IC THAT COSTS $27.50 AND ROUGHLY DUPLICATES FUNCTIONS OF THE SR-50. PERHAPS HE CAN BE PERSUADED TO COMPLETE THAT DESIGN. OTHER ITEMS HE IS WORKING ON ARE 4K DYNAMIC RAM MEMORY, 16K SHIFT REGISTER MEMORY, AND A SCAN CONVERTER, 16K BITS OF SR MEMORY ORGANIZED AS 128 X 128 DOT POSITIONS ON A BLACK AND WHITE TV SET. THIS UNIT COULD BE USED FOR LINE GRAPHING, STATISTICAL ANALYSIS, AND VIDEO GAMES. A FOLLOW-ON PROJECT WOULD INTERFACE TO A COLOR TV."

DR. SUDING HAS BEEN SELECTED AS A KEYNOTE SPEAKER AT THE DAYTON HAMVENTION, DAYTON, OHIO, SUNDAY, APRIL 27, 1975, 2:00 PM, THE LARGEST HAM CONVENTION IN THE WORLD. HIS TOPIC IS "THE MICROCOMPUTER IN DESIGN AND APPLICATION WITH HAM RADIO". HIS MARK-8 WILL BE ON DISPLAY AND OPERATING AS A CW STATION, RTTY STATION, SLOW-SCAN TV STATION, AND USING NAME RETRIEVAL BY CALL. ALL OF THESE APPLICATIONS ARE UP AND RUNNING ON HIS MARK-8 AND WILL BE MADE AVAILABLE LATER THRU THE DIGITAL GROUP. ANYONE IN THE MARK-8 GROUP SHOULD ATTEMPT TO ATTEND IF THEY ARE IN THE AREA.

THE ALTAIR 8800 -- THE DREAM MACHINE! OR A NIGHTMARE?

MORE AND MORE PEOPLE KEEP WONDERING ABOUT THE ALTAIR 8800 AND HOW THEY CAN MAKE THE KIT PRICES SO LOW. A LOT OF PEOPLE HAVE GAMBLED ON IT. (SEVERAL THOUSAND BACK ORDERS ACCORDING TO ONE REPORT.) I SUSPECT THAT ITS A LOSS LEADER TO TRY TO LOCK PEOPLE INTO BUYING THEIR ADD-ONS. AT LEAST ONE RUMOR IS FLOATING AROUND ABOUT THEM USING FACTORY FALLOUT 8080'S. (INTEL SAYS YOU CAN ALWAYS TELL A FALLOUT. IF IT DOSEN'T HAVE THE FULL FACTORY MARKINGS, THEN IT IS NOT A PRIME COMPONENT AND IS SOME FORM OF FALLOUT. THAT MAY NOT KEEP IT FROM WORKING BUT IT DOES MAKE A GUY NERVOUS.) WITH THE KIND OF BACKLOG THEY ARE SUPPOSE TO HAVE, YOU MAY HAVE TO WAIT MANY MONTHS FOR DELIVERY AND THEN YOU'LL STILL BE STUCK WITH THE PROBLEM OF MEMORY AND PERIPHERALS.

IF THE FUTURE ARTICLES ON PERIPHERALS IN POPULAR ELECTRONICS ARE GLORIFIED ADVERTISEMENTS AS THE LAST TWO HAVE BEEN, THEN WHAT? I SUGGEST THAT EACH NEWSLETTER PARTICIPANT TAKE A FEW MINUTES OF TIME TO WRITE PE AND TELL THEM WHAT YOU THINK OF THE TWO ALTAIR 8800 ARTICLES. MINE WON'T BE COMPLIMENTARY! EVEN THE INFORMATION PACK DIDN'T CONTAIN ANY REAL CONSTRUCTION INFORMATION.

I ASKED MITS TO RESPOND TO OUR PRELIMINARY STANDARDIZATION PROPOSAL AND SUPPLY US WITH THEIR PLANNED PERIPHERAL I/O FUNCTIONS AND CODES SO WE COULD ATTEMPT TO DESIGN STANDARD INTERFACES THAT COULD BE USED WITH EITHER THE MARK-8 OR ALTAIR 8800. THEIR REPLY WAS: "NO, IT IS NOT POSSIBLE FOR YOU TO RECEIVE 'A DESCRIPTION OF I/O CODES AND THEIR ACTIONS FOR 8800 PERIPHERALS'. MITS IS A BUSINESS AND AS SUCH, WE DON'T GIVE OUT THIS TYPE OF INFORMATION." THIS IS A FIRST! THEY MAY BE THE ONLY MINICOMPUTER MAINFRAME MANUFACUTER IN THE WORLD THAT REFUSES TO HELP YOU INTERFACE TO THEIR COMPUTER. GOOD LUCK, IF YOU ORDERED AN 8800.

THE STUDENTS AND STAFF OF THE CABRILLO COMPUTER CENTER WERE PARTICULARLY EXCITED TUESDAY, 11 FEB. WE RECEIVED A PDP-8/E CENTRONICS LINE PRINTER INTERFACE. WE FIGURE THAT IF THEY SENT AN INTERFACE, OUR 6 MONTH OVERDO LINE PRINTER CAN'T BE VERY FAR BEHIND. WE WERE COUNTING ON USING IT FOR PREPARATION OF THE NEWSLETTER AND MAILING LABELS.

THE AUDIO CASSETTE TAPE DATA STORAGE UNIT - DON LANCASTER'S IDEAS

(THE FOLLOWING WAS ROBBED FROM PAGE 12 OF THE LASTEST PEOPLE'S COMPUTER COMPANY NEWSPAPER AND IS AN EXPERIMENT IN PARTICIPATORY DESIGN ORGANIZED BY LEE FELSENSTEIN. LET US KNOW IF YOU MAKE ANY PROGRESS IN THIS DIRECTION AND THEN NOTIFY PCC.)

ENTER DON LANCASTER, CARRYING A 40-LEGGED BUG CALLED A UART. "AHA!" SAYS DON, "I'VE NOTICED SOMETHING ABOUT THE UART THAT MAY HAVE ESCAPED YOU. YOU KNOW THAT IT REQUIRES A CLOCK SIGNAL AT EXACTLY 16 TIMES THE BIT RATE, RIGHT?" RIGHT. SO?

"WHAT THAT REALLY MEANS IS THAT NO MATTER WHAT THE SPEED, 16 CLOCK CYCLES INTO THE RECEIVER CLOCK MARKS OFF ONE BIT OF DATA. IF YOU HAD A CLOCK FREQUENCY OF 16 TIMES THAT BAUD RATE RECORDED ON THE SAME TAPE AS THE DATA, AND YOU USED THAT CLOCK TO RUN A UART TO RECEIVE THE DATA, THE CLOCK WOULD ALWAYS BE AT THE RIGHT SPEED FOR THE DATA, NO MATTER HOW SLOPPILY THE TAPE RAN!" BUT WE DON'T HAVE A STEREO TAPE--

"NO NEED FOR TWO CHANNELS. JUST RECORD THE DATA AS AN AMPLITUDE MODULATED SIGNAL ON A CARRIER FREQUENCY OF 16 TIMES THE BAUD RATE. FROM ONE TAPE CHANNEL YOU HAVE 16 CYCLES PER BIT, LOUD OR SOFT DEPENDING ON WHETHER THE DATA IS 1 OR 0, BUT ALWAYS THERE. JUST AMPLIFY AND LIMIT THE CARRIER AND FEED IT TO THE CLOCK INPUT OF THE UART. DEMODULATE THE DATA WITH AN AM DETECTOR AND FEED IT TO THE SERIAL INPUT OF THE UART. OUT COMES 8 BITS ALL LINED UP PROPERLY ON THE PARALLEL OUTPUT PINS!"

WOW! WHAT AN IDEA! NOW ALL WE HAVE TO DO IS SOLVE THE LITTLE PROBLEMS.

LITTLE PROBLEM #1. THE UART RECEIVER PRESENTS ITS DATA TO THE WORLD AS UP TO EIGHT PARALLEL BITS. BUT IF WE WANT TO USE IT AS A PAPER TAPE REPLACEMENT AT A TERMINAL, WE HAVE TO COME OUT WITH SERIAL DATA. (NOT A PROBLEM FOR MOST MARK-8 USERS.) SOLUTION: USE THE OTHER HALF OF THE UART, THE TRANSMITTER. FEED IT A NICE, CONSTANT CLOCK FROM AN OSCILLATOR AND TIE ITS DATA AND CONTROL INPUTS TO THE RECEIVER'S OUTPUTS. THEN WHEN A WORD OF DATA COMES IN FROM THE RECEIVER, IT GETS SQUIRTED OUT TO THE COMPUTER AT JUST THE RIGHT SPEED. TO AVOID TAPE OVERRUNNING THE TRANSMITTER, THE RECEIVER SHOULD BE SET FOR ONE STOP BIT AND THE TAPE RECORDED WITH TWO STOP BITS. THAT ALLOWS FOR UP TO A TEN PERCENT SPEED DIFFERENCE WITHOUT STUMBLING.

LITTLE PROBLEM #2. RECORDING THE DATA ON THE TAPE. DON SUGGESTS A 15 DB DIFFERENCE FROM A "1" TO "0". THIS WORKS OUT TO "0" BEING 17% OF THE "1" CARRIER AMPLITUDE.

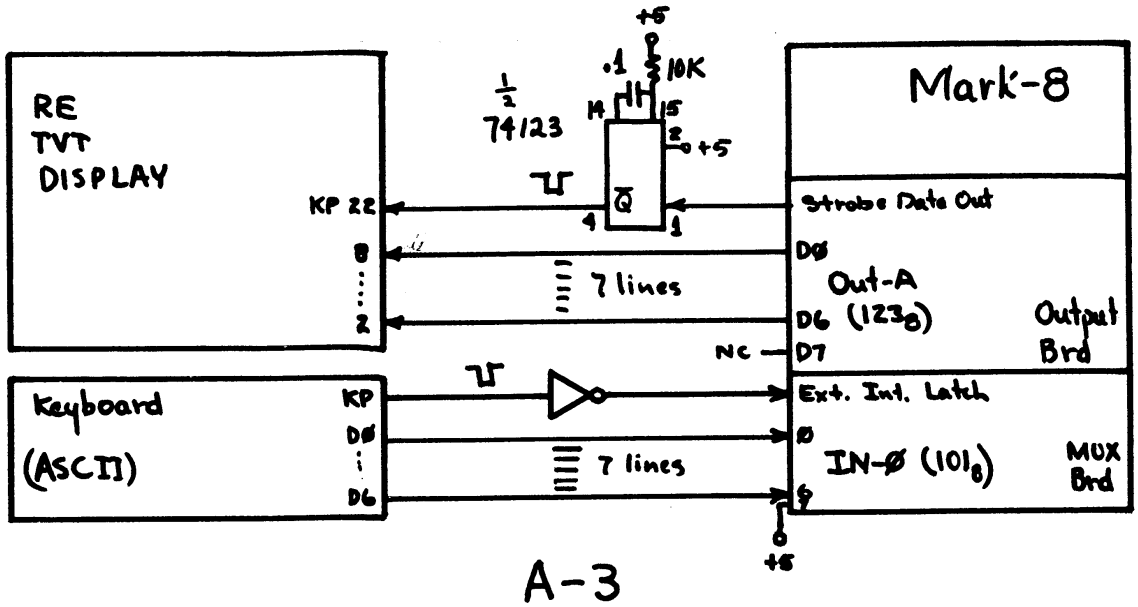
LITTLE PROBLEM #3. CONTROLLING THE AMPLIFICATION OF THE SIGNAL RECEIVED FROM THE TAPE. POSSIBLE APPROACHES INCLUDE: A) AUTOMATIC GAIN CONTROL CIRCUIT. B) A LEVEL INDICATOR SO YOU CAN ADJUST THE PLAY LEVEL PROPERLY AND SEE IF IT FALLS BELOW THE MINIMUM DURING PLAYBACK. C) RECEIVER CIRCUITRY WITH ENOUGH "DYNAMIC RANGE" TO ALLOW FOR A WIDE RANGE OF INPUT SIGNAL LEVELS.

LITTLE PROBLEM #4. THE AMPLITUDE DEMODULATION - MINIMIZING THE EFFECT OF NOISE SPIKES.

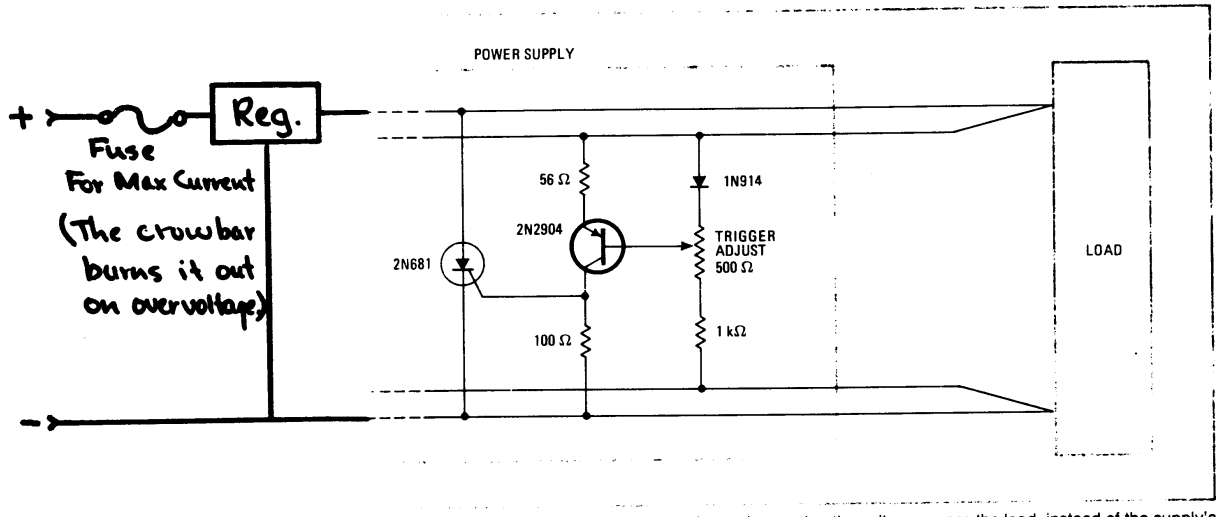
LITTLE PROBLEM #5. EXTRACTING THE CLOCK SIGNAL WITHOUT INTERFERENCE FROM NOISE OR LOW SIGNAL LEVELS. A BIG AMPLIFIER WITH A LIMITER WOULD AMPLIFY NOISE UP TO SIGNAL LEVELS. A PHASE-LOCKED LOOP WOULD BE NICE BUT A LITTLE EXPENSIVE, THOUGH IT WOULD ELIMINATE NOISE PROBLEMS. MAYBE A SERIES OF SMALL AMPLIFIERS AND LIMITERS, WITH TRIGGER THRESHOLDS FOR NOISE REJECTION?

LITTLE PROBLEM #6. CONTROLLING TAPE MOTION. MOST CASSETTE RECORDERS HAVE A REMOTE ON/OFF SWITCH WHICH STOPS THE MOTOR. THIS COULD BE REPLACED BY A PAIR OF RELAY CONTACTS WHICH PLUG INTO THE SAME JACK. WILL CONTROL BE MANUAL? MANUAL START AND AUTOMATICALLY MAINTAINED UNTIL THE SIGNAL STOPS? WHAT KIND OF RELAY TO USE? CAN SOMETHING OTHER THAN A RELAY BE USED?

Paul Farr's TVT - MARK-8 Interface



A-3

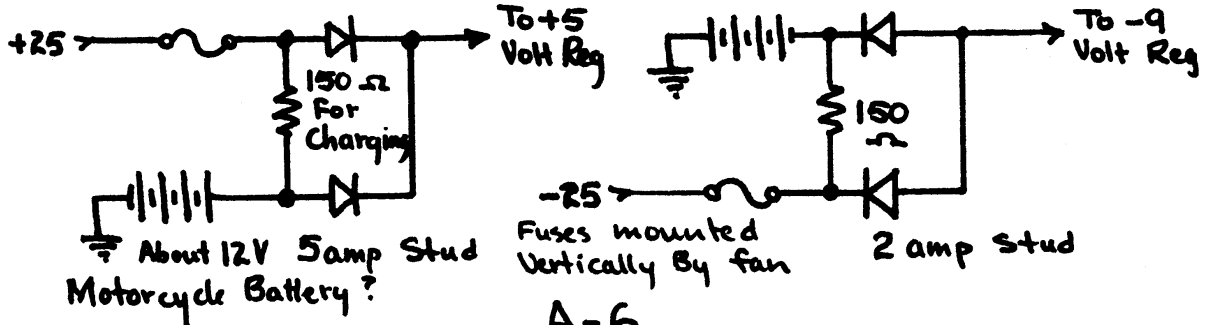


Better protection. Crowbar circuit protects a power supply from overvoltages by sensing the voltage across the load, instead of the supply's output voltage, which is the usual approach. This means that overvoltage sensing will not be affected by wiring voltage drops, nor will there be an increased sensitivity to voltage transients. The components shown here are for a power supply of 4 to 10 volts at up to 20 amperes.

(Turn crowbar upside down for use with −9 Volts.)

Another Crowbar Circuit A-5

Jay Bowden's Circuit For Making Precision Systems Power Supply Uninterruptable.



A-6

ANALOG-TO-DIGITAL CONVERTER

Theory of Operation

As the computer addresses output port B with an output command the latch output goes high. This initializes the 74193 counters to zero. As long as the latch is high the counters are held at zero. This holding period can be used to select one of up to 255 different analog signals (vial an analog multiplexer). When the latch goes low the 74193's begin to count (assuming a voltage greater than zero is being measured). Clock pulses for the counting circuit are obtained from the 8008 "Sync" clock. As the 74193's count through their binary progression they cause the 8-bit DAC to generate a staircase output on pin 4. This output is compared with the buffered input voltage. When the two signals are equal the output of the comparator goes low and stops the counting of the 74193's. The binary output of the 74193's at this point is directly proportional to the input voltage. The computer can sense this binary output at any time (with an input command) and act on it as directed.

Adjustments: "Vref" to the MC1408 (pin 14) is adjusted for a 2mA current at pin 4 when all TTL inputs are high (≈2v). The following program provides the proper delay and in/out instructions:

Location	Instruction		Comment
x	LAI		Load A Register with analog device #
x+1	OUT B		Select analog device & initialize cntr
x+2	LAI	⎫	
x+3	240_{10}		
x+4	INA	⎬	1.05 millisecond delay
x+5	JFZ		
x+6	x+4		
x+7		⎭	
x+8	INP Y		Y = analog converter port #

REPORT ON MY VISIT TO INTEL

I MADE AN APPOINTMENT AND DROPPED BY INTEL ON DEC. 27. THEY WERE INTERESTED IN OUR GROUP, HELPFUL TO THE EXTEND THAT I RECEIVED COPIES OF ALL OF THEIR PUBLICATIONS, UNINTERESTED IN HELPING OUT THE GROUP IN ANY SIGNIFICANT WAY, UNWILLING TO PART WITH DIAGNOSTIC SOFTWARE OR GIVE US ACCESS TO THEIR PROGRAM LIBRARY, AND TOTALLY UNWILLING TO TALK ABOUT QUANTITY PURCHASES ALTHOUGH I WAS TOLD THAT WE SHOULD PUT TOGETHER A PACKAGE OF ITEMS WE WANTED IN QUANTITY AND THEN TALK TO THE DISTRICT DISTRIBUTORS. I RECEIVED A VERY NICE TOUR OF THEIR DESIGN AND MANUFACTURING FACILITY. SINCE A VERY HIGH PRIORITY NEED IS SYSTEM CHECK-OUT DIAGNOSTIC PROGRAMS, I ESPECIALLY TRIED TO OBTAIN THEM AND WOULD YOU BELIEVE THEY SAID THEY DON'T HAVE ANY!! HOW DO ALL OF THOSE CHIPS GET TESTED AND THEIR INTELLEC 8'S AND 8-80'S??

HERE IS WHAT WILL INTEREST YOU:

1) INTEL USER GROUP PROGRAM LIBRARY - IT COSTS $100 TO JOIN (RIDICULOUS) BUT THEY WOULD PREFER TO HAVE YOU JOIN BY SUBMITTING A PROGRAM FOR AN 8008 OR 8080 WHICH WOULD GET YOU A YEARS MEMBERSHIP. FORMS FOR SUBMITTING THE PROGRAM CAN BE OBTAINED BY WRITING USER'S LIBRARY, INTEL, 3065 BOWERS AVE., SANTA CLARA, CA 95051. THE 8008 SECTION HAS 18 PROGRAMS LISTED INCLUDING A FLOATING POINT PACKAGE, RAM TEST PROGRAM, TTY LOAD AND DUMP, AND A PROGRAM THAT SENDS MORSE CODE FOR TEXT TYPED ON THE TTY.

2) BOOKS OF INTEREST

- B) MCS-8 (8008) ASSEMBLY LANGUAGE PROGRAMMING MANUAL-200 PAGES $5.00 (THIS ONE TAKES UP WHERE THE SCELBI MANUAL LEAVES OFF. EXCELLENT - WELL WORTH $5.00)
- C) 8080 ASSEMBLY LANGUAGE PROGRAMMING MANUAL - 80 PAGES $5.00 (IF YOU ARE INTERESTED IN 8080'S YOU NEED THIS.)
- D) INTELLEC 8/MOD 8 1) REFERENCE MANUAL (CONTAINS INTELLEC 8 SCHEMATICS) $5.00 2) OPERATORS MANUAL $5.00
- E) INTELLEC 8/MOD 80 (8080) 1) REFERENCE MANUAL (CONTAINS INTELLEC 80 SCHEMATICS) $5.00 2) OPERATORS MANUAL $5.00 (I DIDN'T GET THIS ONE BUT IT PROBABLY EXISTS.)

I STOPPED BY THE MICROSYSTEM INTERNATIONAL SALES OFFICE IN PALO ALTO. IF YOU FILL OUT THE CARD IN THE FLYER ATTACHED, YOU'LL RECEIVE A PACKAGE OF INFO INCLUDING THE MF8008 APPLICATION BULLETIN 80007 WHICH INCLUDES THE MOD 8 DESIGN AND THE MONITOR 8 USERS GUIDE AND PROGRAM LISTING. YOU MIGHT ALSO ASK FOR BULLETINS 80001C (SHORTFORM CATALOG), 80004A (LINEAR IC'S), AND 80005 (MOS MEMORIES).

STANDARDIZATION PROPOSAL

EVERYONE SAYS LETS STANDARDIZE BUT NO ONE WILL SAY WHAT TO! ABOUT JAN 10, I DECIDED TO FACE THE PROBLEM, AND PROPOSED A PARTIALLY THOUGHT OUT LIST OF POSSIBLE PERIPHERALS AND WHAT THEY SHOULD COST AND A LIST OF I/O ASSIGNMENTS. THIS WAS INTENDED AS SOMETHING THAT PARTICIPANTS COULD "THROW ROCKS" AT IN AN ATTEMPT TO GET SOME DIALOGUE GOING IN THE DIRECTION OF STANDARDIZATION. THIS WAS SENT OUT TO ABOUT 50 OF OUR MOST ACTIVE PARTICPANTS AND OTHER INTERESTED PARTIES. INFORMATION RECEIVED IN RESPONSE TO IT WAS TO BE INCLUDED IN THIS NEWSLETTER BUT THE IMPORTANT ITEMS ALREADY INCLUDED SQUEEZED IT OUT AND IT WILL HAVE TO BE INCLUDED IN ISSUE #6. IF YOU WOULD LIKE TO RECEIVE THE POPOSAL AND THE COMMENTS RECEIVED SO FAR AND THEN REPLY TO IT, PLEASE SEND A 20 CENT SASE AND A CAMERA READY DESCRIPTION OF SOMETHING OF INTEREST FOR THE NEXT NEWSLETTER.

LITERATURE OF INTEREST

DON LANCASTER IS ONE OF THE MOST CLEVER DESIGNERS AROUND. HIS RTL COOKBOOK WAS INCREDIBLY GOOD BUT WHO USES RTL LOGIC? HIS TTL COOKBOOK IS ALMOST AS GOOD AND WELL WORTH $7.95. ORDER FROM PCC BOOKSTORE, PO BOX 310, MENLO PARK, CA 94025.

WHETHER YOU LIKE IT OR NOT, SOME DUMMY IS GOING TO SUGGEST USING HEXADECIMAL NOTATION FOR THE 8008 OR 8080. YOUR ONLY DEFENSES ARE:
1) HAVE LOTS OF NASTY WORDS STORED UP TO USE ON HIM.
2) ORDER THE 16 PAGE PROGRAMMED INSTRUCTION MANUAL "UNDERSTANDING HEXADECIMAL NOTATION", AVAILABLE FREE FROM EDUCATION CENTER, FISHER CONTROLS CO., MARSHALLTOWN, 50158 (I GOT IT WITH THAT ADDRESS. YOU PROBABLY WILL TO.)

A 176 PAGE DATA CONVERSION HANDBOOK WITH EVERYTHING YOU EVER WANTED TO KNOW AND MORE ABOUT A/D AND D/A CONVERTERS IS AVAILABLE FOR $1.50 FROM HYBRID SYSTEMS, 87 2ND AVE., BURLINGTON, MASS 01803.

THE DESIGNERS GUIDE TO PROGRAMMED LOGIC BY PRO-LOG CORP., 852 AIRPORT RD., MONTERY, CA IS A VALUABLE REFERENCE FOR 8008 USERS. (WHETHER ITS WORTH $10.--, I HAVEN'T DECIDED YET.)

WRITE MOTOROLA SEMICONDUCTOR PRODUCTS, 5005 E. MCDOWELL RD., PHOENIX, AZ 85008 FOR BROCHURES ON THEIR M6800 MICROPROCESSOR SERIES. IT'S SUPPOSE TO BE MUCH BETTER THAN THE 8080 AND AVAILABLE SOON.

A COMPLIMENTARY ISSUE OF THE "NEW LOGIC NOTEBOOK" IS AVAILABLE FREE FROM MICROCOMPUTER TECHNIQUES, INC., 11227 HANDLEBAR ROAD, RESTON, VIRGINIA 22091. IT CONTAINS A COMPLETE DESCRIPTION AND BLOCK DIAGRAM FOR ALL OF THE MICROPROCESSORS THAT HAVE BEEN BUILT OR PROPOSED.

WRITE THE DIGITAL EQUIP. CORP. COMPONENT GROUP, ONE IRON WAY, MARLBOROUGH, MASS 01752 AND ASK FOR M7341, M7344, M7345, M7346 8008 MODULE DATA SHEETS AND THE APPLICATION NOTES, "GENERAL INTERFACING TECHNIQUES FOR M7341 MICROPROCESSOR MODULES" (CONTAINS I/O EXPANSION INFO), AND "INTERFACING THE TU60 CASSETTE UNIT TO THE M7341 MICROPROCESSOR". FOR YOU INTERRUPT NUTS, THE M7346 MODULE HAS THE CUTEST 8008 PRIORITY INTERRUPT SCHEME YOU HAVE EVER SEEN. (THANKS TO MAURY GOLDBERG FOR SENDING THESE.)

THANKS TO ROBERT KELLEY, 5806 MT TERMINAL DR., WACO, TX 76710, I'VE HAD A CHANCE TO LOOK AT THE MARTIN RESEARCH BOOKS. I'M SLIGHTLY COLORBLIND ON THE RED END OF THE SPECTRUM AND THE RED PLASTIC PAGES TO DISCOURAGE COPYING DON'T BOTHER ME AT ALL AND THE CONTENT IS GREAT. OH, IT WOULD HURT TO PAY $100 FOR IT. YOU'D BETTER HUNT DOWN SOMEONE THAT CAN LOAN YOU THEIR COPY FOR A FEW DAYS.

WE MAY BE THE ONLY HOBBY COMPUTER GROUP IN THE WORLD WITH THEIR OWN POET LAUREATE. ADD MRS. GENEVIEVE ALLWEN, 1328 N. BALDWIN, PORTLAND OR TO THE ROSTER. (MY MOM WANTS TO RECEIVE THE NEWSLETTER AND HER POETRY IS INTERESTING! SAMPLES WILL APPEAR AS SOON AS SHE IS INSPIRED.)

COMMENTS FROM CURRENT PARTICIPANTS

ADAM TRENT, BENDIX BOX A ASCENSION, PATRICK AFB, FL 32925 SAYS HE FEELS LIKE HE IS BEING LEFT BEHIND BY THE SPEED WITH WHICH THINGS ARE HAPPENING (WHO DOSEN'T?). HIS MARK-8 & TVT PROJECTS WERE INTENDED TO BE LEARNING EXPERIENCES WHICH HE SAYS THEY CERTAINLY HAVE BEEN. HE WORKS WITH A UNIVAC 1218 WHICH IS USED TO HANDLE TRACKING DATA AND TO PROVIDE ANGLE POINTING DATA FOR THEIR S-BAND DISH ANTENNA. HE SUBMITTED A BEAUTIFUL HANDBOOK TYPE FORMAT IN WHICH HE HAS ARRANGED THE MARK-8 INSTRUCTIONS WHICH LISTS THE MNEUMONIC, OCTAL, BIN, HEX AND INSTRUCTION DESCRIPTIONS. ITS 7 PAGES LONG, MUCH TOO BIG TO INCLUDE, BUT WE CAN SUPPLY COPIES FOR A NEWSLETTER ARTICLE AND A 20 CENT SASE.

ROBERT SWARTZ, 195 IVY LANE, HIGHLAND PARK, IL 60035, PURCHASED THE MICROSYSTEMS INTERNATIONAL BOARD SET FOR THE MOD-8 SYSTEM AND SAYS THE BOARDS AND THE SYSTEM ARE GREAT. (MARTY SPERGLE OF M&R ENTERPRISES CONTACTED MIL AND OBTAINED A RELEASE TO ENABLE US TO HAVE THE BOARDS ETCHED FOR US BY ANYONE. THE MOD-8 BACKPLANE CONTAINS A PROM PROGRAMMER THAT USES ABOUT $40 WORTH OF PARTS. THE MIL MONITOR IS FABULOUS. HE HAS A SAMPLE ROM WITH A BAD BIT AND IS PRESENTLY USING IT.

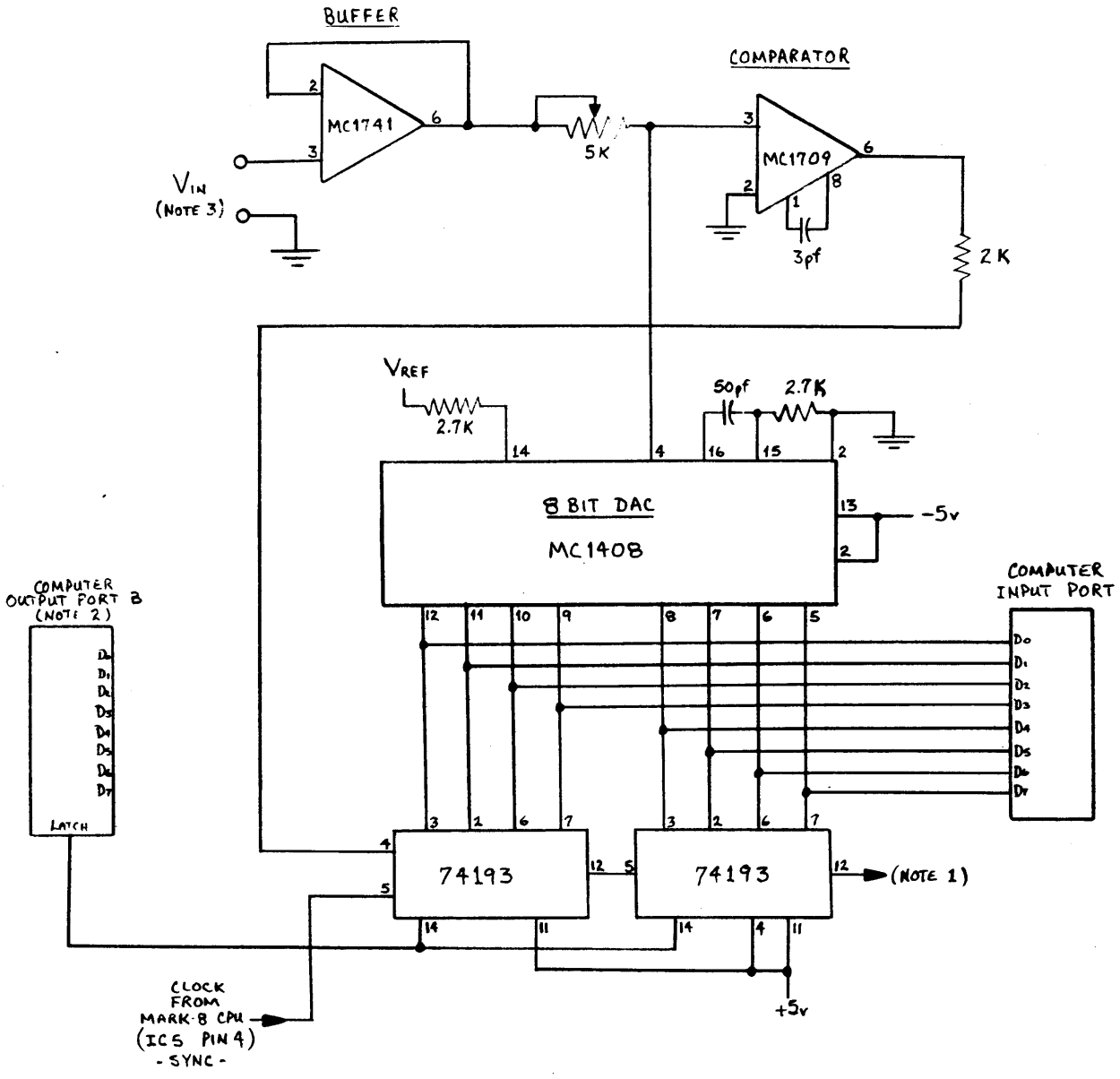
ROBERT IS WORKING CLOSLY WITH BOB COOK, MARK CONDIC, AND DON MARTIN OF MARTIN RESEARCH AND THEY ARE SETTING UP A CHICAGO AREA USER GROUP. ALL PEOPLE IN THE CHICAGO AREA SHOULD CONTACT ROBERT AT 472-6660 DAYTIME, AND 432-6423 AT NIGHT. DON MARTIN WILL SOON SUPPLY AN 8008 KIT PRICED SOMEWHERE AROUND $250.

BOB SAYS THE 74L138 IS PARTICULARLY HANDY FOR USE WITH AN 8008 SYSTEM. HE RECOMMENDS GERBER FOR PARTS, ALL PRIME. CALL TOLL FREE 800-225-8290 TO ORDER OR TO OBTAIN A CATALOG.

A SIMPLE ANALOG-TO-DIGITAL CONVERTER

by

Jim Fry



Note 1: This output could go to some type of overflow latch and/or indicator if desired.

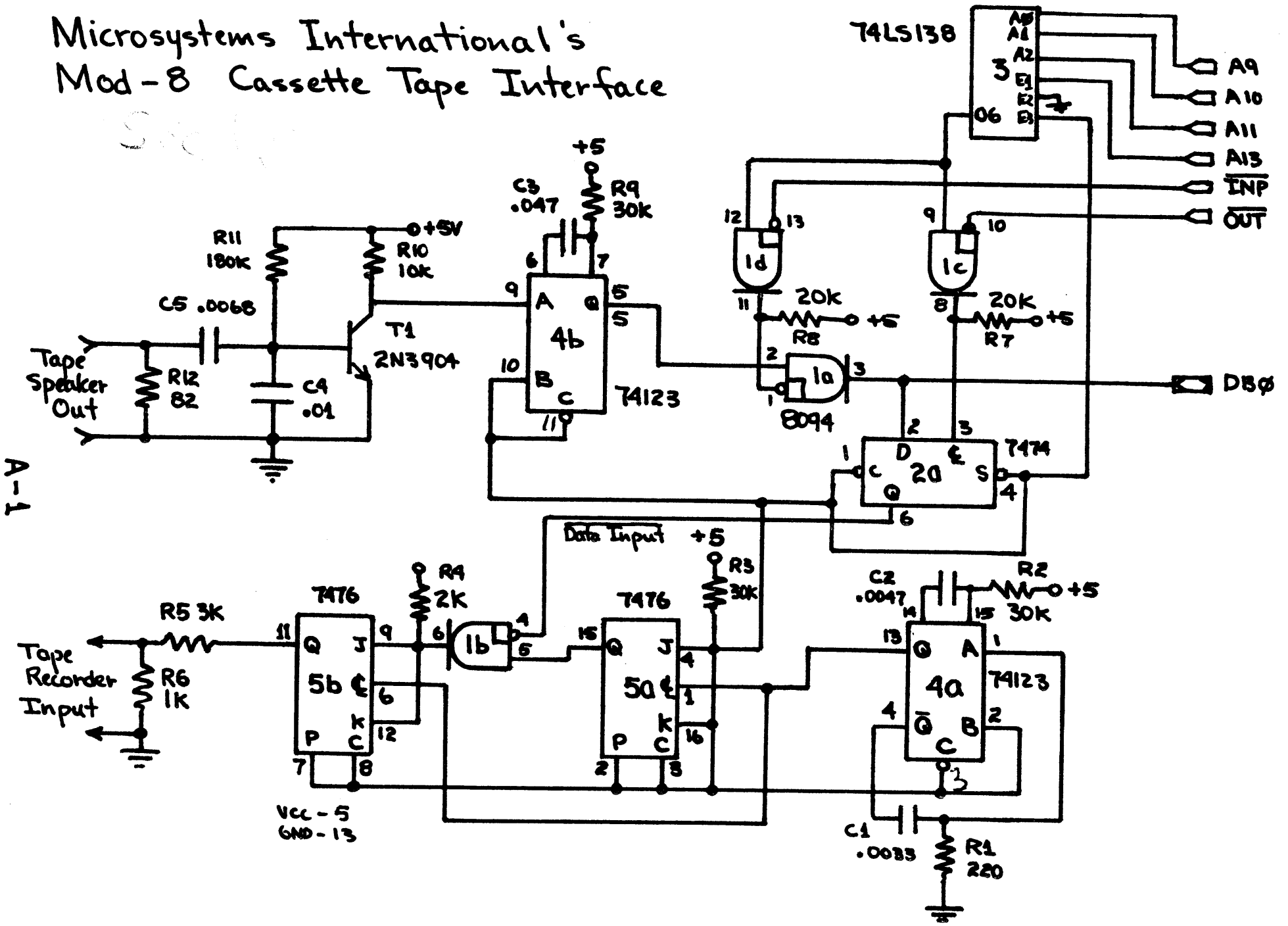
Note 2: D0 thru D7 could be connected to an analog multiplexer circuit.

Note 3: Maximum Vin = 2.55 volts. Accuracy to ±5mv in 10 mv steps.

Note 4: All analog IC's are Motorola.

Note 5: MC 1741 can be replaced by a LM741 & MC1709 can be replaced by a LM709 thereby bringing the total cost from $12.00 to $7.00.

Microsystems International's Mod-8 Cassette Tape Interface



M. PAUL FARR, 3723 JACKSTADT, SAN PEDRO, CA 90731 MADE NUMERIOUS COMMENTS ON OUR STANDARDIZATION PROPOSAL. HE PROVIDED US WITH A SCHEMATIC OF HIS TVT INTERFACE (APPENDIX A-3), AND A VERY COMPREHENSIVE RAM MEMORY TEST PROGRAM, AND HE HAS MADE MODIFICATIONS TO A STANDARD KEYBOARD MONITOR PROGRAM TO HANDLE THE TVT. SEND A SHORT ARTICLE FOR THE NEXT NEWSLETTER AND A 20 CENT SASE FOR A COPY OF EACH. HE REGRETS THAT HE MUST WITHDRAW HIS OFFER TO SUPPLY REVERSED MARK-8 MEMORY BOARDS. THE ARTWORK IN THE RE PACKET WAS NOT GOOD ENOUGH TO PRODUCE QUALITY BOARDS AND HE'D RATHER NOT SEND OUT SHABBY GOODS. HE SAYS THE GENERAL INSTRUMENTS AY-5-1013 UART IS AVAILABLE EVERYWHERE FOR $6.75 IN SINGLE QUANTITY.

RGS ELECTRONICS, 3650 CHARLES ST. SUITE K, SANTA CLARA, CA 95050 HAS UPGRADED THEIR KITS AND MANUALS TO PCC BOARDS SO COMMENTS IN THE LAST NL DON'T APPLY ANYMORE. $25 IS STILL AN AWFUL LOT TO PAY FOR THAT MANUAL. BORROW ONE FROM SOMEONE IF YOU'RE REALLY INTERESTED. THEIR BUS I/O IS REALLY CUTE BUT SUFFERS FROM THE FACT THAT NO ONE ELSE USES IT PRESENTLY.

ROGER SMITH, SMITH ENTERPRISES, 4502 E. NANCY LN., PHOENIX, AZ 85040 INCLUDED THE SCHEMATICS IN APPENDIX A-4 SHOWING HOW TO INTERFACE HIS TVT TAPE RECORDER UART BOARD TO THE MARK-8. HE SAYS HE TRIED ALL KINDS OF CASSETTE TAPE RECORDING TECHNIQUES AND SETTLED ON TONE BURST BECAUSE IT WORKS WELL AND NO CRITICAL TUNING IS REQUIRED.

LARRY PLESKAC, 938 PAULA ST., ESCONDIDO, CA 92027 REPLIED IN DETAIL TO THE STANDARDIZATION PROPOSAL. HE SUGGESTS TWO CASSETTE UNITS, ONE FOR READING, AND THE OTHER FOR WRITING, AND WANTS TO STANDARDIZE THE CASSETTE FORMAT. (I SUSPECT THAT EITHER THE SUDING OR MIL FORMAT WILL BE FORCED AS A STANDARD BECAUSE THEY WORK AND PEOPLE WILL START USING THEM IMMEDIATELY.) EVERYONE IT SEEMS, WANTS MONEY FOR THEIR DOCUMENTATION AND LARRY WONDERS IF WE AREN'T GOING TO BE REDUCED TO A BUNCH OF SMALL BUSINESSMEN DEALING WITH EACH OTHER INSTEAD OF HOBBYISTS.

WILLIAM E. SEVERANCE, CENTER LOVELL, MAINE 04016, 207-925-2271 SAYS HIS MARK-8 HAS BEEN UP AND RUNNING SINCE EARLY DEC. HIS STRANGEST DEBUGGING PROBLEM WAS THE CLOCK WHICH WOULDN'T START ON FREQUENCY. MULTICYCLE INSTRUCTIONS WOULDN'T RUN. HE SOLVED IT BY PARALLELING A 27 PF CAPACITOR ACROSS R3 ON THE CPU BOARD. HE HAS MADE EXTENSIVE MODIFICATIONS TO THE MARK-8, ESPECIALLY TO THE INPUT BUS. HE ALSO MADE EXTENSIVE COMMENTS ABOUT THE STANDARDIZATION PROPOSAL.

JERRY WALKER, 761 CLAYTON, SAN FRANCISCO, CA 94117 SAYS HE HAS THE MARTIN RESEARCH BOOK AND AN 8008 CHIP AND WOULD LIKE TO GET TOGETHER WITH SOMEONE IN THE BAY AREA AND BUILD A COMPUTER. HE HAS 10 YEARS EXPERIENCE AS AN ELECTRONIC TECHNICIAN.

PHIL MORK, 12 WOODLAND RD., WESTON, MA 02193 GOT HIS MARK-8 RUNNING DEC. 22. HE CHANGED HIS MIND AND IS NOW USING SOFTWARE FOR PARALLEL TO SERIAL CONVERSION AND VICE VERSA. HE'S WRITTEN A CONTROL PROGRAM THAT TIES THE TVT, KEYBOARD, AND MODEM TO THE COMPUTER AND ALLOWS OCTAL LOADING AND DUMPING, EXECUTION OF PROGRAMS, AND I/O TO THE MODEM. HE HOPES TO ADD A CHECKING PROGRAM WHICH WILL VERIFY CASSETTE DATA. HIS LOADER PROGRAM SHOULD FIT IN TWO 8223'S WHICH WILL LOAD THE CASSETTE DATA INTO MEMORY, STARTING AT THE ADDRESS WHICH FORMS THE FIRST 2 WORDS AND CONTINUING UNTIL A 377 IS ENCOUNTERED IN CASSETTE DATA. THIS COULD BOOTSTRAP THE REST OF THE CONTROL PROGRAMS INTO THE COMPUTER. HE PROPOSES THE FOLLOWING TAPE FORMAT: 1 7/8 IPS CASSETTE, 300 BAUD, 1 START, 8 DATA, AND 2 STOP BITS, START BIT LOGIC 1, STOP BITS LOGIC 0, DATA TRANSMITTED LEAST SIGNIFICANT BIT FIRST, LOGIC 1=1270 HZ, & LOGIC 0=1070 HZ. UPON FIRING UP HIS SYSTEM (WITHOUT THE 8008), HIS REGULATOR BROKE DOWN PRODUCING SMOKE AND A MINOR EXPLOSION FROM A 7476. HE REBUILT THE PS, ADDED A CROWBAR, AND FOUND DAMAGE TO BE MINIMAL: 2 7475 AND A COUPLE OF 1101'S. MORAL: YOU REALLY DO NEED A CROWBAR! ANOTHER CIRCUIT IS SHOWN IN APPENDIX A-5. HE SUPPLIED THE CUTE MUSIC PROGRAM THAT YOU MUST TRY WHICH APPEARS IN APPENDIX B-2. NOW THAT HE HAS A RUNNING 8008, HE IS FAR MORE INTERESTED IN SOFTWARE THAN HARDWARE. HE THINKS A COMMERCIAL COMPUTER HOBBYIST MAGAZINE WOULD BE FEASIBLE.

MR. TITUS, TYCHRON, INC. (THE NEW NAME FOR HIS COMPANY), PO BOX 242, BLACKSBURG, VA 24060, 703-951-9030 SAYS HIS CALCULATOR INTERFACE WILL APPEAR IN RE SOON. IT WILL USE THE TI MS-0117 BCD MATH CHIP AND KA ELECTRONICS SALES, 1220 MAJESTY DR., DALLAS, TX 75247 WILL BE SELLING IT AND PERHAPS A KIT OF PARTS ALSO. TECHNIQUES, INC. WILL HAVE THE PC BOARD.

SSG. JACKIE W. PIERCE, 460-84-4884, 178TH SIG. CO., APO NY 09102 WANTS TO KNOW WHETHER WE HAVE SET UP COMMITTEE OPERATION FOR THE GROUP. (ITS HARD ENOUGH TO JUST COMMUNICATE! PERHAPS LOCAL GROUPS CAN ORGANIZE THAT WAY BUT IT SURE DOESN'T SEEM FEASIBLE NATIONALLY IN THE NEAR FUTURE.) HE SUGGESTS THE FOLLOWING STANDARD FORMAT FOR TAPE RECORDING: A TAPE SHOUDLD BE SEPARATED INTO BLOCKS. EACH BLOCK SHOULD BE NUMBERED SEQUENTIALLY AND BE BIG ENOUGH TO STORE 1K BYTES. THERE SHOULD BE APPROXIMATELY 5 SECONDS BETWEEN BLOCKS WITH ABOUT 3 SECONDS BETWEEN THE NUMBER OF THE BLOCK AND THE DATA IN THE BLOCK (TO PERMIT EDITING INFORMATION IN A BLOCK.) THERE SHOULD BE A START AND STOP CHARACTER AROUND THE BLOCK NUMBER AND AROUND THE DATA. IF YOU WANT TO CORRECT OR CHANGE INFORMATION IN BLOCK 001, YOU READ THE TAPE UNTIL 001, THEN STOP (DURING THE 3 SEC INTERVAL), GO TO RECORD MODE, AND WRITE IN A WHOLE NEW DATA GROUP. THE START AND STOP CHARACTERS WILL PREVENT MOST ERRORS DUE TO TAPE RECORDER START UP AND STOP TIMES. HE IS ALSO LOOKING FOR AN A/D CONVERTER THAT CAN SAMPLE AROUND 50 KHZ.

R. S. FORMAN, 2421 NW JOHNSON, PORTLAND, OR 97210 IS CONFUSED AS TO WHETHER TO CONTINUE OBTAINING 8008 PARTS OR TO SWITCH TO AN 8080. HE WANTS HARDCOPY PRINTOUT (TRY BOB COOK'S CREEDS). NOTE HIS NEW ADDRESS.

BOB ALBRECHT, PEOPLE'S COMPUTER COMPANY, PO BOX 310, MENLO PARK, CA 94025 SAYS HIS $3.00 YEARLY SUBSCRIPTION OFFER TO THE PCC NEWSPAPER IS EXTENDED INDEFINITELY TO MARK-8 PARTICIPANTS. HE IS STARTING TO EMPHASIZE MICROCOMPUTERS AND HOME COMPUTERS HEAVILY IN THE NEWSPAPER. SEVERAL PARTICIPANTS HAVE ALREADY MENTIONED HOW EXCITED THEY ARE ABOUT THE NEWSPAPER'S CONTENT. THE 9 BACK ISSUES FOR $6.00 IS STILL A GOOD BUY. BOB SAYS HE WOULD LIKE TO START A HOBBYCOMPUTER NEWSPAPER IN SEPTEMBER 1975. IT WOULD BE 8 1/2 BY 11, ABOUT 20 PAGES PRINTED ON NEWSPRINT, 6 ISSUES A YEAR, $3.00/YEAR FOR CHARTER SUBSCRIPTIONS, $5.00 THEREAFTER. WRITE BOB AT PCC IF YOU ARE INTERESTED IN SUPPORTING THIS EFFORT AND SEEING WHAT HE CAN DO.

MARK CONDIC, 410 WOODS LANE, #6A, DOWNERS GROVE, IL 60515 HAS A CLASS HE IS TEACHING IN WHICH THEY ARE BUILDING UP SOME OF DON MARTIN'S (MARTIN RESEARCH) NEW 8008 CHEAP 8008 SYSTEM. (I DON'T HAVE ANY OTHER INFO ON IT NOW BUT IT IS SUPPOSE TO BE GOOD.) BOB SWARTZ SAYS MARK IS WILLING TO WRITE A BASIC BUT ISN'T WILLING TO WRITE THE FLOATING POINT PACKAGE. WE GOTCHA, MARK!!!! JOE CIMMINO, 19304 RICHWOOD COURT, BROOKEVILLE, MARYLAND 20729 WILL HAVE A SUPER FLOATING POINT PACKAGE AVAILABLE SOON. CAN WE PLACE OUR ORDER?? A BASIC LIKE DEC'S PDP-8 EDU10 THAT WILL RUN IN 6K BUT WILL ALLOW YOU TO DEFINE LARGER MEMORY SIZE FOR TEXT AND DEFINE MACHINE LANGUAGE FUNCTIONS. DEC PUTS EDU10 IN 4K OF 12 BIT WORDS SO AN 8008 BASIC IN 6K SHOULDN'T BE UNREALISTIC. MARK SAYS HE HAS A CROSS ASSEMBLER THAT RUNS ON A UNIVAC/1108. HE SUGGESTS REGIONAL NEWSLETTER DISTRIBUTION POINTS. HE AND BOB SWARTZ ARE ACTIVELY FORMING A CHICAGO AREA USER GROUP.

DAVID HIGGIN, KHIG/STEREO 105, PO BOX 1106, PARAGOULD, AR 72450 WOULD LIKE TO HAVE AN ASSEMBLER AVAILABLE IN PROM. HE IS GOING TO BUY A MITS 8080 WITH HIS IRS '74 RETURNS.

JOHN B. HOPKINS, 29 GRANDVIEW AVE., PITMAN, NJ 08071 SAYS THE COMPUTER HOBBYIST GUYS ARE GREAT AND HE IS ALSO IMPRESSED WITH THE PCC NEWSPAPER. HE WOULD LIKE TO SEE SEPERATE EDITORS FOR VARIOUS SPECIAL INTEREST AREAS, A SOFTWARE LIBRARY, AND WOULD LIKE THE GROUP TO INVOLVE ONLY 8008 SYSTEMS. HE HAS A RUNNING MARK-8 WITH 1.5K OF 1101'S WITH OCTAL LOADING VIA 8 PUSHBUTTON SWITCHES DECODED BY SOFTWARE. (I'D LIKE TO SEE THAT SOFTWARE SINCE MY MARK-8 CONFIGURATION COULD EASILY BE SET UP THIS WAY ALSO.) HE CONTRIBUTED THE RANDOM NUMBER GENERATION ALGORITHM IN APPENDIX B-3. HE HAS ACCESS TO SEVERAL LARGE LIBRARIES SO IF YOU CAN'T FIND A PARTICULAR REFERENCE LOCALLY HE'S WILLING TO HELP. HE WOULD LIKE TO SEE US GET TOGETHER ON A STANDARD TTY I/O.

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We have received a large number of copies of magazine articles which would be of interest to all of us. Hal and I have decided the best approach would be the legal one and therefore we are going to get permission to reprint from the publishers and then include them in future newsletters. In the meantime those of you having access to Electronic Design News magazine will find the list on page A-3 of interest.

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Phillip C. Bold, 963 South Iowa St., Addison ILL 60104, plans on getting started on his Mark-8 toward the end of January.

Harry G. Derks, 658 Goldenrod Ave., Holland MICH 49423, is currently building his Mark-8.

Edward C. Epp, Science Dept. Swan Lake Christian Camp, Viborg S.D. 57070, is planning to build a Mark-8.

Frederick H. Faulkner (Hal) Lt. Col. USAF, 58 Offutt Rd., Bedford MA 01730, is hard at putting together his TVT and Mark-8. He has plans for cassette tape, possibly 4K of 1101's or interfacing 20K bytes of core, hard copy (printer), and a modem & acoustic coupler for telephone interface. He wants to acquaint his daughter (11) and son (17) with computer programming and applications. (which is one of my big goals.)

LGC Engineering, 1807 Delaware St., Berkeley CA 94703, are builders of the "Tom Swift Terminal" (or "A Convivial Cybernetic Device") which is an inexpensive computer terminal for public-access information systems. Their goal is to dispel the theory that the more complex a technology becomes the less useful to society it becomes.

SSgt Jackie W. Pierce, 460-84-4884, 178th Signal Co., APO New York 09102, has built, and is testing, a cassette recorder modem which operates at 3800 bps. It requires a frequency cntr & dual-trace scope for calibration.

Phil Lohr, 3917 Flowerfield Rd., Charlotte N.C. 28210, has his Mark-8 about 85% finished & the TVT about 30%. And, what a system he's going to have! He's got a floppy disc, card reader, card punch, and plans on a 16K memory. It's going to be used for research work, developing a Computer Design Simulator language, and probably be retired eventually to a GP household computer.

Gerald McKee, W6ZQT, Six S Company, P.O. Box 4667, San Jose CA 95126, plans on using his Mark-8 for learning programming and updating his electronics background (which goes back to 1940).

Bro. Felix N. Neussendorfer, Colegio San Antonio Abad, Box 729, Humacao, Puerto Rico 00661, will be using his Mark-8 as a tool for teaching programming. He is currently building the TVT and plans to build a cassette interface & controller. He expressed a concern over availability of software for the 8008. (That's what this User's Group is all about, Felix. After we all get the little beasts running the interchange of software will become the big thing.)

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Hal has some additional goodies to contribute to this issue so I'm now going to drop it off at his house for the finishing touches. Incidentally, he and I have reached a decision regarding the future of the Newsletter. We will be working together on it in the future as a joint project (and I'm sure you can appreciate the fact that it is too much for one man).

It's been a pleasure.

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Gordon French, 614 18th Ave., Menlo Park CA 94025, AND Jerry Filek, 774 Miller Ave., San Jose CA 95129, have been working for several months on an intelligent terminal controller which uses an 8008 for control. They have written an interpretive processor language and math routines which use ASCII number strings.

Gary E. Friedrich, 2618-C Capitales Dr., Rancho Cordova CA 95670, has joined the growing list of Mark-8 builders.

Several of you Canadians have mentioned the difficulty of getting parts up there in Canada. Recv'd a note from K.M. Hamilton, 116 Joffre St., Dartmouth Nova Scotia. He runs an electronic mail order house and may be of assistance.

Fred Hatfield, Computer Data Systems, Inc., 1372 Grandview Ave., Columbus OHIO 43212, is currently writing a system for an 8080 w/a disc. He is a good man to know if you have a Teletype (manuals, parts, misc. info, etc.). He has a home PDP/8.

Robert A. Helber, 2417 E. Yucca St., Phoenix AZ 85028.....another newcomer.

J. Horner, 3289 NE Duncilley, Portland OR 97212.....also.

A.J. Kleinschnitz, Ch. Eng., AKI Industries, Inc., 23 Abbeyview Ave., Willow Grove PA 19090

John LaTocha, 2130 University Ave. #89, Madison WI 53705

Emerson Lawson, Jefferson Productions, One Julian Price Place, Charlotte NC 28208

Jeff Mendenall, P.O. Box 782, Ridgecrest CA 93555

Larry Moss, 9347 O'Day Drive, Highland IND 46322

Jim Rawlings WB6QGY, 211 Milo Place, San Ramon CA 94583

Michael Semanczuk, 40 Willow St., Elmwood Park N.J. 07407

Lloyd L. Smith, 530 Pierce Ave., Dyer IND 46311, has recv'd his circuit boards.

Larry Stein, 151 Kline Blvd., Colonia N.J. 07067

John Szilock, 3395 Cliff Road N Unit 30, Mississauga ONT Canada C5A-3M7

Dave Turner, Box 24/1647, FPO New York 09540 (an electronic tech stationed in Spain)

David Walters, Route 4 Box 386, Andalusia ALA 36420

David R. Jewell, 2495 Oro Ave., Oroville CA 95965, hasn't started yet but anticipates using his micro-computer for scientific calculations & plotting math functions.

Sgt. Lee C. Hanson, PSC Box 648, APO San Francisco 96366, has his Mark-8 up and running & would like to get some basics on programming (Once again, I would recommend the Scelbi manual). He made a remark about convincing his wife the cost of the TVT would be worthwhile. It's for sure you're not alone in that department, Lee.

Hey....one of you Ham radio operators should compile a list of all the Hams who are into this thing so you guys can get together on the air. It seems that several of you are interested in code conversion, radio teletype (w/a TVT), etc.

S Lieberman, 1489 Durango Ave., Los Angeles CA 90035, has put together the Southwest Tech Prod Corp Keyboard & Encoder Kit KBD-2 and finds that some of the switches on his unit are hanging up. Does anyone have a cure for the problem?

Jim Fry has come up with a significant contribution in the way of a low-cost analog-to-digital converter. He has included, along with the schematic, a theory of operation and a test program for making adjustments. The entire package may be found on page A-3.

RICK BRENNAN, 601 S. KNIGHT, PARK RIDGE, IL 60068 BOUGHT THE ALTAIR 8800 KIT AFTER EVALUATING THE RGS AND IEU KITS. THE IEU INFORMATION PACKAGE IS A COMBINATION OF NATIONAL IMP-16 LITERATURE REPRINTS AND A FEW DESCRIPTIONS OF THE KIT, SCHEMATICS, PC BOARDS, AND PARTS LAYOUTS. IT IS DEFINITELY NOT FOR THE BEGINNER. HE ORDERED A SET OF REPRINTS FROM EDN FOR $6.95 ON MICROPROCESSORS AND WILL LET US KNOW WHETHER THEY WERE WORTH THE MONEY.

THANKS TO LEE C. HANSON, 51 CES, BOX 648, APO SAN FRANCISCO 96366, WE NOW HAVE A COPY OF THE SCHEMATIC FOR THE PRECISION SYSTEMS POWER SUPPLY. IT WILL HAVE TO BE REDRAWN BEFORE IT CAN BE DISTRIBUTED. LET US KNOW IF YOU NEED A COPY. LEE IS VERY IMPRESSED WITH THE COMPUTER HOBBYIST. HE WONDERS IF HE DID THE RIGHT THING BY GOING THE MARK-8 INSTEAD OF WAITING FOR THE 8080 SYSTEM. (I MAYBE OVERLY PESSIMISTIC BUT I SUSPECT THAT YOU'LL BE VERY GLAD YOU DIDN'T DEAL WITH MITS.) HE WOULD ALSO LIKE SOME ARTICLES ON ELEMENTARY COMPUTER THEORY SO HE CAN SORT OUT THE STRANGE VOCABULARY PEOPLE KEEP USING.

DAVE CHAPMAN, 3420 S. PERKINS RD., MEMPHIS TN 38118 HAS AGREED TO SERVE AS "ART EDITOR" FOR THE NL. WE'LL CHALLENGE HIM BY ASKING HIM TO RE-DRAW THE PRECISION SYSTEMS POWER SUPPLY SCHEMATICS.

STEVE CIARCIA, 41 HILLTOP DRIVE, WEST HARTFORD, CN 06107 HAS HIS SCELBI COMPUTER RUNNING AND IS EVEN MORE ENTHUSIASTIC THAN BEFORE REGARDING THE QUALITY OF THE BOARDS AND THE DESIGN OF THE SYSTEM. (I'VE HEARD RUMORS THAT THE PRICE OF THEIR BOARD SETS HAS BEEN REDUCED. THAT MAY NOW BE THE BEST WAY TO GO. (THEY DO PUBLISH A USER NEWSLETTER. PERHAPS THEY OFFER THAT ON A SUBSCRIPTION BASIS.)

BILL MILLER, 2813 WAGNER DR., BURLINGTON, NC 27215 SUGGESTS NL SUBSCRIPTIONS AND RECOMMENDS THAT PARTICIPANTS SUBMIT SCHEMATICS AND PROGRAMS IN CAMERA READY FORM (OH!!! PLEASE DO! YOU WOULDN'T BELIEVE THE AWFUL COPIES AND SCHEMATICS WE RECEIVE AND THERE JUST ISN'T TIME TO REWRITE AND REDRAW EVERYTHING.) HE HAS AN RGS-8A AND ASR33. HE RECEIVED DON TARBELL'S CASSETTE TAPE INFO AND WILL BUILD IT AND LET US KNOW HOW IT WORKS.

LARRY MOSS, 9347 O'DAY DR., HIGHLAND, IN 46322 WONDERS IF PERIPHERALS CAN REALLY BE BUILT AT PRICES MENTIONED IN THE STANDARDIZATION PROPOSAL. HE PLANS TO BUILD A SMALL DIGITAL DATA ACQUISITION SYSTEM AND AN AUTOMATIC FIST FOLLOWER (MORSE CODE TO TTY CONVERTER). THE SENDING PROGRAM IS AVAILABLE IN THE INTEL USER LIBRARY. ALSO CONTACT DR. SUDING, C/O DIGITAL GROUP, BOX 6528, DENVER CO 80206 FOR SOME REALLY FANCY INFORMATION ON HAM STUFF.

JAY C. BOWDEN, 1613 ENCINO DR., ESCONDIDO, CA 92025 HAS HIS MARK-8 RUNNING WITH A KEYBOARD AND LED DIGIT READOUTS. NOW HE WANTS SOME SOFTWARE TO MAKE IT DO SOMETHING USEFUL. HE USED A PRECISIONS SYSTEMS POWER SUPPLY AND HAD 5 OUT OF 35 BAD 1101'S FROM IEU. HE SUPPLIED THE CLEVER CIRCUITS IN APPENDIX A-6 TO MAKE THE PS UNINTERRUPTABLE. HE IS INTERESTED IN A 4K DYNAMIC RAM MEMORY. (WITH 2102'S HEADING BELOW $5 EACH, IT DOSEN'T APPEAR PRACTICAL ANYMORE!) HE MENTIONED MICRAL A FRENCH COMPANY THAT MAKES AN ELABORATE 8008 SYSTEM WITH AN AVAILABLE BASIC. HE WOULD ALSO LIKE TO KNOW MORE ABOUT PL/M. (IT COSTS SOMETHING LIKE $1250 TO BUY FROM INTEL AND REQUIRES A BIG FORT IV MACHINE TO RUN.) HE WOULD ALSO LIKE TO KNOW IF ANYONE ELSE WOULD LIKE TO SPLIT THE COST OF THE SCELBI CALCULATOR PROGRAM.

MICHAEL G. SCOTT, ROUTE 1, BOX 105, KIRON, IOWA 51448 HAS STARTED ON A TVT AND NOTES THAT SWTP NO LONGER SUPPLIES TVT BOARDS. (SEMTRONICS, RT 3 BOX 1, BELLAIRE, OH 43906 DOES BUT YOU MAY WANT TO CONSIDER THE NEW SWTP TVT OR THE DIGITAL GROUPS TVT INSTEAD.) HE WOULD LIKE TO KNOW HOW MANY 2524'S CAN BE DRIVEN BY THE TVT CLOCK DRIVER?? HE SUGGESTS WRITING TO SIGNETICS, 811 EAST ARQUES AVE., SUNNYVALE, CA 94086 FOR THE BIG WHITE DATA BOOK WHICH HAS DATA ON EVERYTHING.

JOSEPH A. CIMMINO, 19304 RICHWOOD COURT, BROOKEVILLE, MARYLAND 20729 IS PROMOTING A WASHINGTON DC USER'S GROUP AND INTENDS TO SET UP AN 8008 AND 8080 SOFTWARE DISTRIBUTION HOUSE. THE GROUP'S RESOURCES INCLUDE MARK-8'S, INTELLEC 8'S, MIL MOD-8'S, BIG COMPUTERS, ETC, AND THEY ARE CONTEMPLATING BIG THINGS FOR THE FUTURE. THEY INTEND TO HAVE ONE EACH OF THE SEMISTANDARD DEVICES THE USER GROUP ESTABLISHES SO THEY CAN DO SOFTWARE MODIFICATION FROM ONE FORMAT TO ANOTHER. THEY HAVE PURCHASED THE INTEL USER LIBRARY. THEY WILL SOON SET UP A TELEPHONE COMMUNICATIONS NETWORK USING MIKE HAYES' (MNH ELECTRONICS) MODEMS AND JOE IS EVEN SUGGESTING USE OF THE HAM RTTY SATELLITE NETWORK FOR NATIONAL DISTRIBUTION OF SOFTWARE. MAYBE WE CAN GET THEM TO WRITE UP WHAT THEY HAVE GOING FOR THE NEXT NEWSLETTER. JOE IS DOING THE GROUP A SERVICE BY PUTING THE ROSTER INTO MACHINE READABLE FORMAT. CONTACT HIM IF YOU WANT TO BUY A COMPLETE SET OF STICK-ON MAILING LABELS. HE WILL SOON MAIL OUT AN ELABORATE SURVEY FORM ASKING PARTICIPANTS DOZENS OF QUESTIONS REGARDING WHAT THEY ARE DOING AND WHAT THEY WANT TO DO IN THE FUTURE. HE WILL COMPILE THIS INFO AND MAKE IT AVAILABLE TO ALL OF US SO PLEASE TAKE FILLING IT OUT SERIOUSLY. HE IS ALSO WORKING ON A SUPER 8008 FLOATING POINT PACKAGE.

JIM FRY, DIGI-TEL ELECTRONICS, POBOX 6585, TOLEDO OH 43012 SENT A LETTER TO PARTICIPANTS OFFERING 2102'S AT less than $5.45 EA. IF HE COULD COLLECT ORDERS FOR 1000. SOME PEOPLE WERE SUSPICIOUS SO HE ASKED THAT THIS LETTER BE REPRINTED IN THE NEWSLETTER:

DEAR INQUIRER:

THANK YOU FOR YOUR INTEREST IN THIS PROJECT. I DON'T MIND YOUR BEING A BIT SKEPTICAL. I AM A MEMBER ALSO OF THE CABRILLO GROUP AND YOU WILL FIND MY NAME ON THEIR ROSTER. I HAVE UNDERTAKEN THIS PROJECT SO THAT WE COULD OBTAIN THIS NECESSARY & EXPENSIVE PART AT THE BEST POSSIBLE PRICE.

AT THE TIME I FIRST WROTE TO HAL ABOUT HANDLING THE PAPERWORK & ORDERING FOR THE GROUP, THE PRICE WAS $7.00 EACH IN QUANTITIES OF 1000. SINCE THAT TIME I HAVE FOUND A SOURCE FOR 2102'S FOR $4.95. THAT IN ITSELF IS A SIGNIFICANT SAVINGS; SO I DECIDED NOT TO WAIT FOR THE NEWSLETTER TO COME OUT, BUT TO WRITE TO THE MEMBERS DIRECTLY. I BORROWED COMPANY STATIONARY, HAD LETTERS PRINTED, AND CONNED MY WIFE INTO DOING THE TYPING. I AM NOT DOING THIS AS A MONEY MAKING PROJECT, AND DON'T INTEND TO BECOME A SURPLUS DEALER. I AM ASKING ONLY 10% OVER OUR COST TO COVER MAILING EXPENSES. THIS IS NOT MY BUSINESS BUT MY HOBBY.

THIS WILL BE A ONE TIME ONLY ORDER, THEREFORE I HAVE ASKED FOR A 10% DEPOSIT SO I KNOW EXACTLY HOW MANY WE WILL NEED. I DEFINITELY DO NOT WANT ANY SURPLUS. THESE DEPOSIT CHECKS WILL NOT BE CASHED UNTIL THE ORDER IS ACTUALLY PLACED AND WILL BE RETURNED TO YOU IF WE DON'T GET OUR MINIMUM QUANTITY. ORDERS ARE COMING IN AND I HOPE WE MAKE IT. THE OFFER DEADLINE HAS BEEN EXTENDED TO MARCH 14.

I FAILED TO MENTION IN MY INITIAL LETTER THAT THESE UNITS WILL HAVE MIL-SPC-883 PROCESSING. THEY ARE GUARANTEED BY THE MANUFACUTRER; AND ALTHOUGH I DO NOT EXPECT ANY RETURNS, I WILL HANDLE ANY COMPLAINTS WITH THE MANUFACTURER. I WOULD SUGGEST USING SOCKETS OR MOLEX PINS WITH THIS DEVICE TO OVERCOME OVERHEATING AND STATIC VOLTAGE PROBLEMS.

I HOPE THIS LETTER EXPLAINS MY POSITION. WE DO NEED YOUR SUPPORT IN GETTING THIS QUANTITY PRICE. HOPE TO HEAR FROM YOU SOON.

SINCERELY, JIM FRY

JIM SAYS HE TRIED PHIL MORK'S FRONT PANEL SWITCH MODS (NL #4) AND FOUND THAT WHEN IN SINGLE STEP AND INTERRUPT MODES, HE COULD NOT SINGLE STEP. HE MOVED SS COMMON TO THE B TAP TO CORRECT IT.

TERRY RITTER, DANTCO, 2524B GLEN SPRINGS WAY, AUSTIN TX 78741, 512-441-0036 HAS COMPLETED HIS EXECUTIVE MONITOR SYSTEM WHICH INCLUDES KEYBOARD ENTRY, MODIFICATION, & PROGRAM INITIATION, TTY OCTAL DUMP IN WHICH ALL MASKING, BAUDOT TRANSLATION, BIT TIMING, AND SERIAL OUTPUT IS DONE IN SOFTWARE. HE SAYS THAT AFTER TWO WEEKS OF USE HE IS WELL SATISFIED AND WOULD MAKE ONLY MINOR CHANGES IF HE WERE TO RECONSTRUCT IT. HE SUPPLIED A COPY AND A CIRCUIT OF HIS BAUDOT SERIAL ISOLATED TTY DRIVER, AND AN OCTAL LISTING IN WHICH HE HAS PARTITIONED THE 8008 OP CODES INTO LOGICAL GROUPS TO EASE PROGRAMMING, AND AN OCTAL LISTING WITH COMMENTS OF HIS EXECUTIVE. ITS LONG! SEND A NL ARTICLE AND A 20 CENT SASE FOR A COPY OF THE ABOVE. HE MADE HIS OWN ROM BY

Dale Berggren, 9207 S.W. 43rd Ave., Portland ORE 97219, has a unique and interesting suggestion: A SWAP SHOP section to the NL. To quote him....."Not a big-deal, make-a-profit thing but just a place to get rid of unwanted or unneeded things in hopes of getting needed items. No money involved. No commercial interests, etc."
He also asks if anyone has compiled a name & address list (with their Mark-8) of the User Group members? Might be a worthy project. He is currently building a "Day Clock' with variable length interrupts (more info on that after he's tested it).

::
PEOPLE's COMPUTER COMPANY ----P.O. Box 310, Menlo Park, CA 94025
Fantastic publication - I thoroughly enjoy it. Bob Albrecht, the editor, writes that he had such a good response to the offer made in NL #4 that he will extend it to the user's group for an additional period of time (til Feb 28, '75). See NL #4 for details.
::

Dr. George L. Haller, 1500 Galleon Dr., Naples Fla. 33940, has a Scelbi w/2K of memory, Tape interface, & model 32 RO. He's programming it for golf handicaps (which consists of accepting 20 scores; sorting; adding the lowest ten in double precision; subtracting the course rating; dividing by ten; multiply by 0.85 (whew!), and then output the result.

Dr. James G. Callas, 631 No. San Pedro Rd., San Rafrael CA 94903, would like to see a recommended list of books (software & hardware) which would be applicable and helpful to the Mark-8 users. (digital group??) He also commented on a NL comment regarding doctors in "hobby" computers:...."That's hardly the right word for some of the very serious computer applications involved."

Here's a good one..... a note from a gentleman in Pearl City, Hawaii which says: "Aloha: Please kindly send me copy of your latest Catalogue." AND IT'S TYPED ON THE BACK OF A LABEL FROM A CAN OF DOLE PINEAPPLES!! Now, there must be a really interesting story behind that one!

- -
Due to circumstances beyond our control, we will now do a "BRANCH & PECK" to a different typewriter. (or is that a "BRANCH & BOMB"?)
- -

Adam Trent, Bendix Box A Ascension, Patrick AFB FLA 32925, is stuck down there on Ascension Island (working for NASA) and is about to fire up his Mark-8. He speaks very highly of MNH-AE Applied Electronics. They provide extensive documentation on their surplus electronics & top quality. He is planning to interface his 8 with a UNIVAC 1218. Should be interesting.

James R. Boddie, Apt. 216, 420 No. Dean Road, Auburn ALA 36830, has a running Mark-8. And, he gives a lot of credit to the NL bug reports (which a lot of other people have also). You will find his Memory Diagnostic program on page B-1.

(After 3½ pages I've decided on the appendices! Appendix A will contain HARDWARE information (schematics, etc.); Appendix B will be devoted to SOFTWARE; and Appendix C will be reserved for flyers and announcements from COMMERCIAL SUPPLIERS.)

Laurence Platt, 2220 Skyline Way, Santa Barbara CA , is hard at it (fighting the solder bridges) and should have his Mark-8 up soon.

Doug Arnold, #9 Colonial Village, Brookings S.D. 57006, is a senior at SDSU and is working on a core memory interface design for the 8008.

Peter Wolfe, Box 139, Yarrow B.C. Canada V0X 2A0, is getting started on his Mark-8 and is getting the 8008 from Martin Research along with their book Microcomputer Design.

Stephen Gilmore, 2014 Perkins Ln., Redondo Beach CA 90278, is currently working on a TTY to Mark-8 interface while waiting for the processor parts to arrive.

J.N. Noren, 111-11033-127 St., Edmonton, Alberta Canada, is still struggling along trying to get parts for his Mark-8 and indicates his interests will be in the software development areas. He's building a dual Mark-8 system.

John G. Raiche, 10406 55th Ave. So., Seattle WA 98178, almost has his Mark-8 flying. Send for that Scelbi manual, John, if you're looking for a good basics manual.

.....

Just received the letter from Jim Fry concerning the 1k static RAM's----cancel my previous comment about designing a refresh for the 4K dynamic memories---- I didn't realize the prices were getting so far down on the static (he's trying for a quantity order at $5.45 each).

.....

Gregory W. Hart, 8948 Ramstad Ave., Fair Oaks CA 95628, is presently constructing his Mark-8 and in comparing the construction booklet and the Intel Users Manual he has noted several items which seem to be in error with regard to the output ports. (I haven't checked this out, so I'll just give it to you verbatim.)
--"An output instr is 01 RRM MMM where the RR≠00 and the MMM= the output port location from port 0-7. In the Mark-8 only the RR=01 is used thereby limiting us to 8 output ports. The Mark-8 as constructed using the booklet only allows 7 output ports to be used, ports 1-7. In many cases in the booklet reference is made to output port 0 being addressed by a 121 instr. However, in tracing the circuit I note that the 7442 decoder on the output port board has no connection made to the 0000 input which corresponds to a 121 instr. Pin 1 of the 7442 (IC 12) is the 0 output which corresponds to the 121 instr and should be utilized. As it is I don't understand how the Mark-8 can use port 0 since it is never decoded. On the LED Reg board the 7442 decoder is wired correctly so that when a 121 instr is given the 0 bit of the 7442 (pin 1) is used to enable the LED display. Perhaps because most users only use the display rather than the actual port 0 they aren't aware of the error. Same errors noted in the sample programs:(a 121 = port 0, 123 = port 1, 125 = port 2, & 127 = port 3) Yet on page 9 the sequencing program lists a 123 as port 2 (& same mistake on page 10 in the counter input program)"--

Vincent Buscemi, Newfield High School, Marshall Dr., Shelden N.Y. 11784, is trying to get the school to finance an 8080 system. He was asking about a good computer basics manual and also stated that he was sending for a Scelbi manual. That is an excellent manual for basics and more.

Capt. Mack Ward, 17 Nijmegen St., Ft. Bragg, N.C. 28307 states that the bug reports and other info has helped him in getting along with the construction of his Mark-8.

Mark Peterson, Teaching Specialist, Dept. of Industrial Education, University of Minn., Duluth Minn., says the use of small brass rivets for plated thru holes works quite well (see your local auto brake relining shop for rivets)-- no soldering neccessary. He also sent the interesting ad from Delta Electronics Co. (no address) for card reader assemblies on page .

J. Scott Williams, P.O. Box 932, Bellingham WA 98225, (computer programmer) has decided to go with the ALTAIR 8800 (Jan 75 PE) because of the stronger interrupt capability (compared to the 8008). I know how he feels....everything I encounter which increases the 8008's capability I latch onto.

Doug Drye, 3202 Winchester Dr., Greensboro N.C. 27406, writes that the Computer Hobbyist Group in North Carolina has decided to publish their newsletter on a regular basis ($6.00 per yr.).

Bob Thomas, 910 Sonman Ave., Portage PA 15946, would like to see a memory system based upon the new 4K dynamic chips (so would a lot of us....how about somebody getting an in with one of the supuliers, and then design a nice simple refresh circuit? ---it's so simple to just sit back and suggest these things, isn't it?----). Bob has an order in for the ALTAIR 8800.

HAND THREADING WIRES THRU TORROIDAL CORES! HE WOULD LIKE INFO ON A CHEAP 5203 PROM PROGRAMMER AND IS WORKING ON AN OSCILLOSCOPE OCTAL DISPLAY AND CASSETTE TAPE CIRCUITS. HE STILL OFFERS HARDWARE AND SOFTWARE HELP VIA SASE, AND IS BOTHERED ABOUT HAVING TO PAY FOR EVERYTHING AND IS SURE THERE IS AN ALTERNATE DISTRIBUTION METHOD SUCH AS DAISY CHAINS THRU THE MAIL.

ADDITIONS TO POSTER AS OF FEBRUARY 8, 1975

(NOTE ALSO THE ADDITIONS IN JOHN CRAIG'S SECTION AS WELL. A COMPLETE UP-TO-DATE POSTER WILL BE INCLUDED IN NL #6.)

DONALD K. ABELES, THUNDERBIRD PRINTER, 7054 25TH NE, SEATTLE, WA 98115 IS INTERESTED IN 8008 INTERFACES AND I/O DEVICES AND IN 8008 PROGRAMS.

DON ALLISON, BOX 1685, CRAIG AFB, ALABAMA 36701 IS PLANNING ON BUILDING AN ALTAIR 8800 IN THE SPRING.

MIKE ANASTASION, 6211 QUINCEWOOD CIRCLE, CITRUS HEIGHTS, CA 95610

RICHARD D. APPLING, 1009 G NO. 6, LINCOLN, NEBR 68508

MICHAEL J. BATCHELDER, DEPT. OF EE, SOUTH DAKOTA SCHOOL OF MINES, RAPID 57701

JERRY BILEK, 774 MILLER AVE., SAN JOSE, CA 95129

LEO D. BORES, M.D., OPHTHALMOLOGY, 1055 FISHER BUILDING, DETROIT, MI 48202

JEB BOSWELL, M.D., 29 KENILWORTH ST., NEWTON, MASS 02158

SP/6 JOHN R. BRONSON, 208-26-5689, USACSC SUPPORT GROUP, PO BOX 5307. FT. LEE, VA 23801

WILLIAM BROOKS, BROOKS OPTRONICS, 2971 COPPER RD., SANTA CLARA, CA 95051

BRUCE BROWN, 4801 KENMORE AVE., APT. 1022, ALEXANDRIA, VA 22304

DR. J. N. BURNETT, DEPT. OF CHEM., DAVIDSON COLLEGE, DAVIDSON NC 28036

TOM CARY, 4370 VALENTINE ST., FORT WORTH, TX 76107

JOHN CHOCHRAN, ELECTRONIC AUTOMATION SYSTEMS, INC., PO BOX 966, JESSUP, GEORGIA 31545

PERRY COLSTROM, 5720 MADISON ST. NE, MINNEAPOLIS, MN 55432

WILLIAM CONRAD, 7818 BANCROFT, TOLEDO, OH 43617

CHARLES F. DOUDS, 381 POPLAT ST., WINNETKA, IL 60093 IS DEEPLY INVOLVED IN ELECTRONICS IN MODEL RAILROADING. HE IS CONNECTED WITH THE GARFIELD-CLARENDON MODEL RAILROAD CLUB AND ANYONE WITH SIMILAR INTERESTS SHOULD CONTACT CHARLES AND FIND OUT WHAT THEY ARE UP TO. HE IS ALSO INTERESTED IN COMPUTER TEXT PROCESSING SYSTEMS. HE KNOWS OF A SOURCE OF 1/4 WATT RESISTORS AT $.02 EA IN QUANTITIES OF 100-499. IF YOUR INTERESTED, CONTACT HIM.

ELLIS, JACK. (I LOST HIS ADDRESS. IF YOU KNOW IT, LET US KNOW PLEASE.)

MIKE HAYES, MNH APPLIED ELECTRONICS, PO BOX 1208, LANDOVER, MD 20785 HAD A FLYER IN NL #4 ADVERTISING MODEMS AND POWER SUPPLIES AMONG OTHER THINGS. ADAM TRENT SAYS WE MISQUOTED HIM. HE ORDERED A POWER SUPPLY AND IT IS FABULOUS. THE TTL LOGIC WHICH HE SAID CONTAINED NO GOOD ITEMS WAS ONLY A SAMPLE THROWN IN WITH ANOTHER ORDER FOR FREE. HE SAYS THAT MIKE SUPPLIES QUALITY MERCHANDISE AND MAY BE THE ONLY SUPPLIER THAT FURNISHES COMPLETE DOCUMENTATION WITH SURPLUS EQUIPMENT. I CAN VOUCH FOR THAT. I PURCHASED 3 PAPER TAPE READERS AND RECEIVED 1/2 INCH THICK MANUALS. MIKE SENT ME ONE OF THE MODEMS AND IT COMES WITH A

1/2 INCH THICK DOCUMENTATION PACKAGE. JOE CIMMINO HAS USED ONE OF THE MODEMS TO IMPLEMENT A CASSETTE TAPE UNIT AND SAYS IT WORKS GREAT. THE WASHINGTON DC GROUP IS PLANNING ON SETTING UP A TELEPHONE SYSTEM FOR TRADING SOFTWARE THAT WILL USE THESE MODEMS. THE FSK UNIT INCLUDES ELABORATE NOISE DISCRIMINATION CIRCUITRY AND IS USEABLE UP TO 1900 BITS PER SEC. JOE IS EVEN TALKING ABOUT JOINING UP WITH THE HAM SATELLITE RTTY NETWORK FOR NATIONAL SOFTWARE TRADING. IT MAY BE WORTHWHILE TO TAKE ANOTHER LOOK A TE FLYER IN THE LAST NEWSLETTER AND ORDER CATALOG NO. 8 WHICH INCLUDES AN ELABORATE DESCRIPTION OF THE MODEMS, THE POWER SUPPLIES, AND SOME REALLY WILD ELECTROACOUSTICAL SERIAL MEMORY UNITS.

JOSEPH R. HOKE, 2523 SAINT CLAIR DR., HILLCREST HEIGHTS, MD 20031

ROBERT LEONARD, 3003 DRISCOLL DR., SAN DIEGO, CA 92117

ROBERT LONG, 1815 SWEETWATER RD., SP. 165, SPRING VALLEY, CA 92077

SIDNEY R. MAXWELL II, PO BOX 217, QUENCHEE, VT 05059

MITS, 6328 LINN, NE, ALBUQUERQUE, NM 87108

JOHN C. NEVES, 930 PALO ALTO AVE., PALO ALTO, CA 94301 IS INTERESTED IN MORSE CODE TRANSLATION AND WANTS TO TRY DIGITAL FILTERING ALGORITHMS.

WILLIAM C. PARRISH, PARRISH SOLID STATE POWER SYSTEMS, 127 WINFIELD AVE, JERSEY CITY, NJ 07305

TIM RAND, 59 WILLINGTON OAKS, STORRS, CT 06268

ERIC SCHOTT, 208 14TH AVE., JANIATA, ALTOONA, PA 16601

RALPH E. SKOOG, 6217 KENNEDY AVE., HAMMOND, IN 46323

GARY H. SMITH, 1121 SPARKMAN AVE., MELBOURNE, FL HAS A RUNNING MARK-8.

DR. LEO H. SODERHOLM, RM 213, AG. ENGR., IOWA STATE UNIV., AMES, IOWA 50010

C. SOLOMONS, FRIENDS' CENTRAL SCHOOL, 68TH ST. AND CITY LINE, PHILADELPHIA, PA 19151

STEPHEN C. STALLINGS, THE COMPUTER HOBBYIST, BOX 295, CARY, NC 27511

DAVID F. STOUT, 717 SARANAC DR., SUNNYVALE, CA 94087

ED SZCZEPANSKI, MOOG INC., PRONER AIRPORT, EAST AURORA, NY 14052

O. C. TASKER, PO BOX 168, ROMNEY, WV 26757

GEORGE TATE, 3544 DAHLIA AVE., LA, CA 90026

LESTER C. WARD, BOX 35L, MANTEO, NC 27954

ROBERT E. WHITMOYER, J.D., OLD DOLLAR RD., BOX 13, ROUTE #1, HEUVELTON, NY 13654

RUSTY WHITNEY, OREGON MUSEUM OF SCIENCE AND INDUSTRY, 4015 SW CANYON RD, PORTLAND, OR 97221

DAVID WILLIAMS, STERLING ELECTRONICS, 1061 INDUSTRIAL RD., SAN CARLOS, CA 94070 IS AN MIL DISTRIBUTOR AND SHOULD BE CONTACTED IF ANYONE WANTS PRICES ON QUANTITY PURCHASES.

DAVID YULKE, 121 LIBERTY AVE., SELDEN, NY 11784 WILL SOON OFFER 5203 PROM PROGRAMMING SERVICE. (NOW ALL OF YOU GUYS THAT BOUGHT 5203 PROMS WITHOUT KNOWING HOW TO GET THEM PROGRAMMED HAVE AN OUT.)

MARK-8 NEWSLETTER

31 January 1975 Vol. 1, No. 5

Current Editor:
John T. Craig

"....as happened with television and then color television, the enthusiasts and the well-to-do will be the first to install computer consoles in their homes. Eventually, however, everyone will consider them to be essential household equipment. People will soon become discontented with the "canned" programs available; they will want to write their own. The ability to write a computer program will become as widespread as the ability to drive a car."

Scientific American
September 1966

I recently told Hal Singer that I would be happy to lighten his load somewhat and do the next newsletter. The result is that he stopped by my house a few days ago and dropped off a BOX of correspondence! You just can't imagine the bulk of mail he's been getting. (Or perhaps you can if you notice that the last newsletter was 28 pages in length!)

He mentioned that most of the material was new correspondence but that there were a lot of older letters that he felt he hadn't been able to do justice. I'm going to make every effort to get as much of it all as I can.

As an introduction let me just slip in a few words about myself here and then I'd like to tell you a few things about Hal. I'm a Computer Systems Instructor with Varian Data Machines in Irvine, California. When I tell people that my hobby is building a micro-computer they look at me like I'm some kind of nut. (And, sometimes after teaching, troubleshooting, or studying computer hardware all day I think I know what they mean!) I've been building my Mark-8 in a wire-wrap version and I can assure you that that approach is nothing to write home to Mother about! Unfortunately (and fortunately) I recently acquired a Varian 620-L computer (a basket case) and I've decided to put the 8008 aside for the time being and devote my energies to getting it up and going. (I'm building it (THIS) a board which will plug right into the 620-L, so no telling what kind of interesting application I'll come up with now.)

Now, about this guy Hal Singer that everybody keeps writing to...

I first met Hal about 4½ years ago when he attended an Adult Education class I was teaching in digital electronics. That was about the time that Hal was getting the ball rolling on acquiring a computer for Cabrillo High School (where he teaches math and algebra). His efforts were finally realized and he and a couple of other math teachers have succeeded in building a fine educational tool called the Cabrillo Computer Center. Hal is an "EE", and when he's not building something like the Mark-8 in his home laboratory (workshop) he's busy putting that good electronic know-how to good use building peripherals for the school computer center. (And, he's built some beauts!)

Hal has been throwing real strong hints in the last few newsletters for someone to come up with a standardization scheme for the I/O -- so that the software we develope in the future can be exchanged among ourselves with no problems. He didn't get any response so he generated a version of his own (which looks good), and sent it to about 31 bodies and asked them to evaluate it. He sent it out to people who have their Mark-8's running, Mr. Titus, Intel, Scelbi, Dr. Robert Suding (to whom he would like to apologize - I'm sure - for misspelling his name three different ways), Radio Electronics, MP Publishing, just to name a few. And, you can be sure that NL #6 will be one of the most important because of this effort.

MICRO-8 COMPUTER USER GROUP NEWSLETTER APRIL 15, 1975
HAL SINGER & JOHN CRAIG - EDITORS VOLUME 1, NUMBER 6
CABRILLO COMPUTER CENTER
4350 CONSTELLATION ROAD
LOMPOC, CA 93436
PHONE (805) 733-3501 (1:40 TO 4:30 PST)
(805) 735-1596 (EVENINGS)

STATUS OF MICROSYSTEMS INTERNATIONAL

WE'VE SAID BEFORE THAT INFORMATION CHANGES FAST IN THIS FIELD. NO SOONER HAD THE LAST ISSUE OF THE NL BEEN MAILED OUT THEN MICROSYSTEMS INTERNATIONAL ANNOUNCED THEIR BANKRUPTCY. IT WAS A BIG COMPLICATED DEAL INVOLVING CONGLOMORATE CORPORATE MANIPULATION, LOSS TO THE CANADIAN GOVERNMENT OF MILLIONS OF DOLLARS, AND LOSS TO US OF OUR PRICE COMPETITIVE 2ND SOURCE FOR 8008 AND 8080 MICROCOMPUTER CHIPS AS WELL AS THE MONITOR-8 PROM, RAMS AND OTHER THINGS. IT TOOK EVERYONE BY SURPRISE. MAURY GOLDBERG OF MINI MICRO MART HAD MANY OF HIS ANNOUNCED PLANS AFFECTED. PRESENT STATUS SEEMS TO BE ABOUT AS FOLLOWS: MONITOR-8 ROMS WILL NOT BE AVAILABLE. MAURY GOLDBERG MAY GET A FEW BUT YOU'LL HAVE TO CONTACT HIM FOR THE PRESENT STATUS. THE 8080 MOD-8 BOARDS ARE UNAVAILABLE BUT TWO SOURCES ARE WORKING ON DEVELOPING THEIR OWN 8080 BOARDS FOR THE MOD-8. ALL MOD-8 BOARDS ARE AVAILABLE FROM SPACE CIRCUITS BUT ONE OF THEM THAT USED A SPECIAL SINGLE SOURCE MIL 256 X 4 RAM WILL BE OF NO USE TO ANYONE. MONITOR-80, THE 8080 VERSION OF THE MONITOR-8 DOES NOT EXIST ACCORDING TO OUR BEST INFORMATION. MF8008 INFORMATION BOOKS WERE ORDERED DESTROYED BY MIL BUT SOME HAVE BEEN SALVAGED AND AN ANNOUNCEMENT WILL SOON BE MADE REGARDING THEIR AVAILABILITY. DOCUMENTATION IS STILL AVAILABLE FOR THE MOD-8 CASSETTE CIRCUIT BUT IT WILL PROBABLY NOT PROVE TO BE THE MOST POPULAR UNIT WITH THE MONITOR-8 ROM UNAVAILABLE. SOME MIL STUFF IS STILL AVAILABLE BUT TO OUR KNOWLEDGE, THEY ARE NOT DUMPING STUFF IN SUCH A WAY THAT WE CAN BENEFIT GREATLY FROM IT EXCEPT THRU SPECIAL DEALS FROM SOME OF OUR SUPPLIERS. SO MUCH FOR THAT.

DEALING WITH SUPPLIERS

IN OUR ENTHUSIASM TO GET A MACHINE RUNNING MOST OF US ARE EAGER TO MAIL AWAY LARGE CHECKS TO VIRTUALLY UNKNOWN COMPANIES. ONE HAS TO LOOK BACK ONLY A FEW MONTHS TO SEE HOW ONE OPERATOR GOT TO PEOPLE FOR $500,000 THIS WAY. WHEN YOU SEND OFF A CHECK, KISS IT GOODBY, BECAUSE YOU MAY NEVER SEE THAT MONEY AGAIN. YOUR ONLY PROTECTION IS TO DEAL WITH COMPANIES THAT HAVE AN ESTABLISHED REPUTATION. A FAVORITE GIMMICK IS TO AGREE TO SUPPLY SOMETHING AND SIT ON THE MONEY FOR MANY MONTHS BEFORE DELIVERING. INFORMATION YOU SEE IN THE NEWSLETTER IS FOR YOUR INFORMATION ONLY AND AN EFFORT IS BEING MADE TO KEEP YOU CURRENT ON OTHER PARTICIPANT'S EXPERIENCE WITH ALL SUPPLIERS BUT IT IS UP TO YOU TO VERIFY A COMPANY'S INTEGRITY AND ABILITY TO DELIVER. CAREFULL CLARIFICATION BY MAIL REGARDING DELIVERY TIMES IS ESSENTIAL. ENCLOSE A SELF-ADDRESSED STAMPED-ENVELOPE (SASE) FOR THE REPLY - POSTAGE CAN EAT A SUPPLIER ALIVE SENDING OUT REPLIES AND ADDRESSING ENVELOPES IS A VERY TIME CONSUMING AFFAIR. LET US KNOW IF YOU RUN INTO ANY TROUBLE SO WE CAN WARN OTHERS.

CURRENT NEWSLETTER STATUS

RESPONSE TO OUR $6.00 FOR 6 ISSUE CHARGE FOR MEMBERSHIP HAS BEEN GRATIFYING. NEARLY 300 PEOPLE HAVE SUBSCRIBED PUTTING US NEAR THE BREAKEVEN POINT FOR 6 32 TO 48 PAGE NEWSLETTERS. AS NEW ORDERS COME IN WE WILL BE ABLE TO INCREASE THE SIZE OF THE NEWSLETTER IF YOU CONTINUE TO SEND IN NEWS THAT CAN BE PUBLISHED.

THIRD CLASS MAIL IS RIDICULOUSLY SLOW - OVER A MONTH IN MANY CASES - SO ALL FUTURE NL'S WILL BE SENT FIRST CLASS. THIS ONE'S SIZE WAS DETERMINED BY THE NUMBER OF PAGES THAT COULD BE SENT ON A 20 CENT STAMP.

I MUST APOLOGIZE FOR THE REPEATED MENTION OF CAMERA READY COPY IN THE LAST NEWSLETTER AND THE ATTEMPT TO BRIBE PEOPLE INTO SENDING INFO IN BY OFFERING REPRINTS OF USEFUL INFORMATION. THE MAIN PROBLEM WAS IN NOT EXPLAINING WHAT CAMERA READY COPY IS. THAT SIMPLY MEANS THAT INFORMATION IS TYPED ON 8 1/2 X 11 WHITE PAPER USING A NEW "BLACK" TYPEWRITER RIBBON (NO EZI ERASE PAPER PLEASE). SCHEMATICS SHOULD BE DRAWN NEATLY IN SOFT PENCIL OR BLACK INK. WHEN INFORMATION IS PROVIDED THIS WAY IT IS A SIMPLE MATTER TO CUT AND PAST IT IN THE APPROPRIATE ORDER SO IT CAN BE PHOTOGRAPHED TO MAKE OFFSET MASTERS. THIS SAVES RE-TYPING AND REDRAWING AND WILL ALLOW US TO PRODUCE MANY MORE PAGES OF MATERIAL. MANY OF THE ITEMS IN THIS NL WERE PROVIDED IN "CAMERA READY" FORM.

IT IS RAPIDLY REACHING THE POINT WHERE WE CAN AFFORD TO PRINT THE ITEMS THAT HAVE BEEN TOO BIG TO INCLUDE IN PAST NEWSLETTERS. MANY ITEMS WERE MENTIONED IN THIS NL AND ARE AVAILABLE FOR A SASE AND A COUPLE OF STAMPS TO PAY FOR THE DUPLICATING COSTS.

AN EFFORT HAS BEEN MADE TO INCLUDE ANY INFORMATION THAT WAS SENT IN THAT WOULD BE OF INTEREST TO OTHERS. A SCAN THROUGH ALL OF OUR MAIL (IN FOLDERS THAT STACK NEARLY 3 FEET HIGH), WILL BE MADE TO SEE IF ANY-THING WAS OVERLOOKED. YOU CAN HELP BY TELLING US IF WE LEFT OUT SOME MATERIAL THAT YOU SENT IN THAT SHOULD HAVE BEEN INCLUDED.

MANY PARTICPANTS SAY THAT THEY DO NOT HAVE ANYTHING TO CONTRI-BUTE. IF YOU HAVE YET TO TELL US WHO YOU ARE AND WHY YOU ARE INTERESTED IN MICROCOMPUTERS YOU DO HAVE SOMETHING WORTHWHILE TO CONTRIBUTE.

MANY HAVE WRITTEN AND TELEPHONED ASKING FOR SPECIAL ITEMS. FOR VARIOUS REASONS YOU MAY HAVE BEEN NEGLECTED OR OVERLOOKED. PLEASE TRY US AGAIN.

JOE CIMMINO WILL SOON UPDATE OUR MAILING LIST. HE DEFINITELY WANTS YOU TO LET HIM KNOW IF YOU DO NOT WANT YOUR TELEPHONE NUMBER LIST-

ED. IF YOU HAVE A NEED FOR ADHESIVE MAILING LABELS OF OUR MIST OF PARTICIPANTS, CONTACT HIM. NL #7 WILL CONTAIN A COMPLETE ADDRESS LIST OF EVERYONE THAT HAS CONTACTED US.

LAST MINUTE INFORMATION

WE JUST RECEIVED A CATALOG FROM CYBERTRONIC SYSTEMS, PO BOX 18065, LOUISVILLE, KY 40218 ADVERTISING 8008'S @ $29.95, 4K X 8 2102 MEMORY BOARDS FOR $170.00, UNIVAC SERIES 70 MAG TAPE DRIVES FOR $350.--, AND OTHER VERY INTERESTING INFORMATION. NOTHING IS KNOWN ABOUT THEIR RE-LIABILITY OR INTEGRITY. SEND A SASE FOR THEIR CATALOG.

OFFSET COPIES OF NEWSLETTERS 1 THRU 4 & 5 IF YOU HAVEN'T GOT IT

OFFSET COPIES OF NEWSLETTERS 1 THRU 4 SHOULD BE BACK FROM THE PRINTER IN ABOUT THREE WEEKS. THE PRICE WILL BE $3.50, POSTPAID, FIRST CLASS MAIL. IF YOU ALREADY SENT $3.50, YOURS WILL BE SENT OUT AS SONN AS THEY ARE RECEIVED. IF YOU ARE INTERESTED AND HAVEN'T ORDERED YET, SEND A CHECK FOR $3.50 MADE OUT TO THE CABRILLO HIGH SCHOOL COMPUTER CENTER.

THE CABRILLO HIGH SCHOOL COMPUTER CENTER'S LINE PRINTER FINALLY ARRIVES!

OUR CENTRONICS 508 INCREMENTAL PRINTER FINALLY ARRIVED AFTER ONLY FIVE MONTHS OF AGONIZING WAITING. IT MAY EVEN BE WORTH THE LONG WAIT. IT TAKES THE PLACE OF THE TELETYPE AND ACCEPTS CHARACTERS AT 120 CHARACTERS PER SECOND, HAS COMPLETE VERTICAL FORMAT CONTROL, UPPER AND LOWER CASE, ELONGATED CHARACTER CAPABILITY, AND MANY OTHER BELLS AND WHISTLES. NOTHING ATTACHES TO A COMPUTER WITHOUT A LITTLE PAIN AND WE STILL HAVEN'T GOT IT WORKING AT FULL SPEED. IT SEEMS THAT THEY SENT IT SET UP FOR A SERIAL INTERFACE INSTEAD OF A PARALLEL ONE EVEN THOUGH THE PARALLEL INTERFACE WAS INCLUDED. SINCE OUR CURRENTLY USED SOFTWARE IS TOO DUMB TO INSERT LINE FEED FILL CHARACTERS, WE CAN ONLY OPERATE IT AT A SERIAL RATE OF 30 CPS. SINCE ITS BUFFERED WITH A 132 CHARACTER BUFFER, IT RUNS NEARLY AT FULL SPEED ON SHORT LINES. I HOPE TO HAVE THE PARALLEL INTER-FACE RUNNING BEFORE LONG.

I HAVE BEEN USING OUR TEXT EDITOR TO PREPARE THE NEWSLETTER COPY AND HAD TO TRY IT TO SEE WHAT KIND OF OFFSET COPY IT MAKES. HOPE IT COMES OUT OK.

THANKS, HOPE TO HEAR FROM YOU SOON.

HAL SINGER & JOHN CRAIG

RESULTS OBTAINED FROM STANDARDIZATION PROPOSAL

THE FOLLOWING I/O STANDARDIZATION SCHEME WAS SENT OUT TO ABOUT 50 PEOPLE AND THEY WERE ASKED TO RESPOND TO IT. A SHORTENED AND SLIGHTLY UPDATED VERSION OF THE PROPOSAL, A REVIEW OF THE LETTERS RECEIVED, AND MY CONCLUSIONS FOLLOW:

REQUEST FOR REVIEW OF STANDARDIZATION SCHEME

EVERYONE TALKS ABOUT STANDARDIZATION BUT NO ONLY WILL PROPOSE ANYTHING SO I'M GOING TO. ISN'T THAT BRAVE! PLEASE READ OVER THE MATERIAL CAREFULLY AND "THROW ROCKS AT IT". BE SURE TO OFFER POSITIVE SUGGESTIONS WHERE YOU DON'T AGREE.

DESIGN PHILOSOPHY

THIS IS TO BE AN EXTREMELY LOW COST EXPERIMENTER'S SYSTEM (UNDER $500) USING HOMEMADE EASILY CONSTRUCTED PERIPHERALS. IT IS EXPECTED THAT THE CPU BE SOME VERSION OF THE 8008 (PROBABLY A MARK-8). IF POSSIBLE, ALL PERIPHERALS SHOULD BE USEABLE ON AN 8080 SYSTEM (I.E. ALTAIR 8800) WITH MINIMAL HARDWARE AND SOFTWARE CHANGES. AT LEAST 1K OF MEMORY SHOULD BE AVAILABLE.

A COMPUTER'S USEFULLNESS IS DEPENDENT ON NUMEROUS PERIPHERALS. THE HOBBYIST CAN BARELY AFFORD A SYSTEM AT ALL SO PERIPHERALS MUST BE EXTREMELY CHEAP AND EASILY CONSTRUCTED. THIS WILL BE A PROPOSAL FOR POSSIBLE PERIPHERALS, DEVICE CODES AND A DESCRIPTION WHERE POSSIBLE. NO ONE WILL HAVE THEM ALL. IT IS DESIGNED AS A SHOPPING LIST FOR THE HOBBYIST MUCH AS THE PDP-8 HANDBOOK IS. IT IS NOT INTENDED TO BE A CONSTRUCTION PLAN FOR ANYTHING. IF WE CAN AGREE ON A STANDARDIZATION SCHEME, PEOPLE CAN START PRODUCING DETAILED PERIPHERAL CONSTRUCTION PLANS. I HOPE THAT IT WILL ELICITE A GREAT DEAL OF DISCUSSION, COUNTER PROPOSALS DETECTION OF ERRORS, ETC. SO A HARDWARE STANDARDIZATION SCHEME WILL EXIST THAT EVERYONE CAN LIVE WITH.

DISCUSSION OF POSSIBLE PERIPHERALS

1. FOUR TERMINAL DEVICES ARE PRESENTLY FEASIBLE.
   - A. ASR33 AND KSR33 TTY'S (FOR THE RICH GUYS)
   - B. 5 LEVEL (BAUDOT) TTY'S (BTTY) (ROBERT COOK HAS SEVERAL 100 OF THESE HE WILL OFFER FOR SALE SOON.)
   - C. TV TYPEWRITER (TVT-1) OR SWTP TVT (TVT-2) AND KEYBOARD
   - D. DR. SUDING'S 128 CHARACTER TVT AND KEYBOARD (MISSING SOME OF THE FEATURES OF THE SWTP ONE BUT MUCH CHEAPER TO BUILD AND THE 128 CHARACTER SET IS NICE. HIS 16 LINE BY 64 CHARACTER ONE SHOULD BE THE IDEAL TERMINAL.

THE TYPICAL HOBBYIST WILL PROBABLY USE ONE OF THE TVT'S AS THE SYSTEM TERMINAL WITH A BTTY AS THE HARD COPY DEVICE. SOME MAY WANT TO RUN THE BTTY ONLY WHILE THE RICH GUYS WILL USE AN ASR33.

IT WOULD BE CONVENIENT TO HAVE A SWITCH TO CONVERT FROM A UART TYPE OF TERMINAL INTERFACE TO A SERIAL PULSE SYNTHESIS TYPE.

BAUDOT TO ASCII AND VICE VERSA CODE CONVERSIONS IN SOFTWARE OR HARDWARE MUST BE FIGURED OUT ALSO.

THOSE WITH ONLY 1 TERMINAL DEVICE WILL CONNECT IT AS A UART PARALLEL OR AS A SERIAL SYNTHESIS TTY UNIT. WITH MORE THAN ONE DEVICE, IT MAY BE DESIRABLE TO ALLOW CODE SWITCHING SO THAT THEY CAN BE USED IN DIFFERENT COMBINATIONS WITHOUT CHANGING SOFTWARE.

2. PROM FOR KEYBOARD MONITOR

THE PAGE 0 OF MEMORY SHOULD BE SWITCH SELECTABLE SO THAT IT CAN EITHER BE 256 WORDS OF RAM OR A PROM LOADED WITH THE LAWRENCE LIVERMORE LABS OR THE DIGITAL EQUIPMENT CORP. OCTAL DEBUGGING TECHNIQUE PROGRAM. WITH THIS TYPE OF PROGRAM, SIMPLY TOUCHING THE INTERRUPT BUTTON GIVES YOU COMPLETE TERMINAL DEVICE KEYBOARD CONTROL OF THE COMPUTER ALLOWING LOADING AND EXAMINING OF MEMORY LOCATIONS, READING A TAPE, AND STARTING PROGRAMS RUNNING AT A GIVEN MEMORY LOCATION. COST - ABOUT $30.

3. CASSETTE TAPE INTERFACE

AN INTERFACE FOR LOADING AND DUMPING MEMORY FROM A CHEAP HOBBY QUALITY TAPE RECORDER IS NECESSARY. AT LEAST SIX CIRCUITS ARE NOW KNOWN THAT WORK. THE CASSETTE LOAD AND DUMP ROUTINES CAN BE PUT IN PROM. COST - ABOUT $15 PLUS A $30 ELCHEAPO CASSETE RECORDER PLUS THE COST OF PROMS FOR LOAD AND DUMP ROUTINES.

4. HAND OPERATED PAPER TAPE READER

THIS WILL BE A LITTLE UNIT THAT YOU FEED THE TAPE INTO AND PULL THRU BY HAND AT WHATEVER SPEED YOU WANT. IF YOUR AMBITIOUS, YOU CAN ADD A MOTOR. COST - ABOUT $25, ANOTHER $15 IF YOU WANT A MOTOR.

5. PAPER TAPE PUNCH

SOME PEOPLE WILL HAVE ASR33 TTY'S TO MAKE 8 LEVEL PAPER TAPE. BOB COOK'S BAUDOT CREED TTY'S HAVE A 5 LEVEL PAPER TAPE PUNCH. YOU MAY BE LUCKY ENOUGH TO FIND A SURPLUS PAPER TAPE PUNCH CHEAP. IT'S NEARLY IMPOSSIBLE TO BUILD ONE EASILY AND CHEAPLY. (MOST PROGRAMS WILL BE SAVED ON CASSETTE ANYWAY.)

6. DROP THRU MARK SENSE CARD READER

THIS UNIT WOULD HAVE A SLOT IN THE TOP AND YOU SIMPLY DROP THE CARDS THRU ONE-BY-ONE AND IT READS THEM AND STACKS THEM. COST - ABOUT $50.

7. CARD PUNCH

YOU MAY BE ABLE TO FIND AN OBSOLETE IBM KEYPUNCH THAT CAN BE INTERFACED. IT WOULD BE HARD BUT POSSIBLE TO PRODUCE A UNIT THAT WOULD TYPE MARKS ON A CARD. TOUGH BUT POSSIBLE.

8. OSCILLOSCOPE DRIVER AND LIGHT PEN

A MINIMAL SYSTEM CAN BE BUILT FOR $20 AND A SCOPE THAT IS DC COUPLED ON BOTH THE X AND Y. AN ELABORATE VERSION IS DESCRIBED IN ISSUES 1 THRU 3 OF THE COMPUTER HOBBYIST. COST - $50 FOR HARDWARE PLUS A SURPLUS RADAR SCOPE UNIT.

9. SWITCH RELAY INTERFACE

THIS IS A SET OF 8 RELAYS THAT CAN BE SELECTIVELY SET OR CLEARED FROM AN OUTPUT PORT AND USED TO CONTROL WHATEVER YOU WANT AND 8 EXTERNAL SWITCH SETABLE FLIPFLOPS WHOSE CONDITION CAN BE READ BY AN INPUT PORT. COST - ABOUT $25.

10. MULTICHANNEL ANALOG TO DIGITAL CONVERTER

JAMES FRY SUPPLIED AN 8 BIT A TO D CONVERTER CIRCUIT THAT CAN BE BUILT FOR ABOUT $15 PLUS THE COST OF THE INPUT MULIPLEXOR. COST - UNDER $25. (SEE NL #5)

11. DIGITAL TO ANALOG CONVERTER

AS MANY OF THESE AS DESIRED CAN BE INCLUDED. COST - UNDER $15 PER CHANNEL.

12. CALCULATOR INTERFACE

DR. SUDING HAS A SCIENTIFIC CALCULATOR INTERFACE WITH SR-50 ARITHMETIC CAPABILITY AVAILABLE THAT CAN BE BUILT FOR UNDER $80. MR. TITUS WILL SOON HAVE A CALCULATOR INTERFACE CONSTRUCTION ARTICLE IN R-E USING A TI CHIP.

13. PROM PROGRAMMER

BOTH INTEL AND MIL HAVE PUBLISHED CIRCUITS FOR PROM PROGRAMMERS. COST - ABOUT $60.

14. X-Y PLOTTER

THIS WILL BE EASY IF CHEAP STEPPING MOTORS CAN BE FOUND, A LITTLE TOUGHER IF A SERVO SYSTEM NEEDS TO BE BUILT. TOUGH BUT QUITE POSSIBLE. COST - UNDER $100.

15. DIGITIZER

THIS COULD BE SET UP SO THAT MOVING A STYLUS TO A PARTICULAR LOCATION MOVES BY WAY OF STRINGS, THE X AND Y AXIS TEN TURN POTS, WHICH COULD BE READ BY TWO ANALOG TO DIGITAL CHANNELS WHEN THE DIGITIZER BUTTON IS PUSHED. COST - UNDER $35.

16 IC TESTER

SOMEONE WILL HAVE TO WORK THIS ONE OUT IN DETAIL. COST - ?

17. FLOPPY DISK

THE COMPUTER HOBBYIST GROUP AND MITS HAVE FLOPPY'S RUNNING. RUMOR HAS IT THAT HELMERS OF MP PUBLISHING IS THINKING OF ORGANIZING A GROUP PURCHASE BUT HE REFUSES TO ANSWER LETTERS. COST - ?

18. PROGRAMMABLE REAL TIME CLOCK

THIS WOULD BE A SIMPLE COUNTER THAT CAN BE LOADED UNDER PROGRAM CONTROL AND WILL COUNT USING THE CPU CLOCK AND SET A FLAG AND OR INTERRUPT THE COMPUTER WHEN COUNT REACHES ZERO.

19. TV GRAPHICS TERMINAL

DR. SUDING IS TALKING ABOUT A SHIFT REGISTER UNIT THAT WOULD TURN A TV INTO A 128 X 128 DOT GRAPHICS UNIT WITH A LIGHT PEN.

20 CAN YOU ADD TO THE LIST?

I/O PORT ASSIGNMENTS

AT FIRST ONE WOULD THINK THAT THE 8008 IS LIMITED WITH ONLY 8 INPUT PORTS. HOWEVER, THE ACCUMULATOR IS SENT OUT ON AN INPUT CYCLE DURING T1 OF MEM CYCLE 2 AND IS LATCHED INTO IC8 AND 9 IN THE MARK-8. BY SIMPLY LOADING THE A REGISTER IMMEDIATE AND DOING AN INPUT INSTRUCTION AND DECODING THE VALUE FROM IC8 AND 9, ANY OF THE INPUT PORTS CAN BE MULTIPLEXED FOR 256 POSSIBLE DEVICES. I PROPOSE THAT INPUT PORT 7 BE MULTIPLEXED, WITH 0 THRU 6 RESERVED FOR COMMON DEVICES FOR WHICH YOU DON'T WANT TO GO TO THIS EXTRA TROUBLE.

WITH ONLY 24 OUTPUT PORTS, CAREFULL PLANNING WILL BE NECESSARY TO AVOID USING THEM UP. THESE CAN BE EXPANDED ALSO BUT IT IS MORE OF A HASSLE. MULTIPLEXED INPUT PORTS CAN BE USED FOR CONTROL FUNCTIONS WHERE NO DATA NEEDS TO BE SENT OUT.

THE FOLLOWING CONSIDERATIONS WENT INTO CHOOSING THE SPECIFIED I/O PORT ASSIGNMENTS:

1) OLD INTEL DEVELOPED PROGRAMS (AS WELL AS MIL, PROLOG, AND OTHERS) USE A SERIAL SYNTHESIS TTY CONNECTED TO IP0 BIT P, OP12 BIT 0, OP13 BIT 0, AND THE INT LINE. (OP12 IS OUTPUT PORT 2)
2) LAWRENCE LIVERMORE LABS USES A PARALLEL UART TTY DESIGN USING IP2, OP15, AND IP3 AS A FLAG REGISTER.
3) LAWRENCE LIVERMORE LABS USES A KEYBOARD INTERFACE USING IP4 WITH BIT 7 AS A FLAG.
4) DR. SUDING'S CASSETTE INTERFACE PRESENTLY USES IP1 BIT 0 AND OP11 BIT 0.
5) DR. SUDING'S TVT PRESENTLY USES OP16.

INPUT PORT ASSIGNMENTS

IN0 SERIAL TTY BIT 0. BITS 1-7 USED FOR INT PURPOSES FOR THOSE THAT CARE.
IN1 FLAG PORT (SEE FLAG PORT ASSIGNMENT SECTION)
IN2 TTY READ DATA (UART PARALLEL INTERFACE)
IN3 FLAG PORT (SEE FLAG PORT ASSIGNMENT SECTION)
IN4 KEYBOARD 0-6 DATA BIT 7 KEYPRESSED FLAG.
IN5 & 6 RESERVED FOR FLOPPY DISK
IN7 MULTIPLEXED INPUT PORT WITH ASSIGNMENTS AS FOLLOWS:

MULTIPLEXED INPUT PORT 7

IN7 0-7	PAPER TAPE READER
10-17	PAPER TAPE PUNCH
20-27	MARK SENSE CARD READER
30-37	CARD PUNCH
40-47	OSCILLOSCOPE DRIVER
50-57	SWITCH RELAY INTERFACE
60-67	A-D CONVERTER
70-77	D-A CONVERTER
100-107	MORE D-A CONVERTERS
110-117	CALCULATOR INTERFACE
120-127	PROM PROGRAMMER
130-137	X-Y PLOTTER
140-147	DIGITIZER
150-157	IC TESTER
160-167	FLOPPY DISK
170-177	REAL TIME CLOCK

NOTE THAT AT LEAST 8 CODES ARE RESERVED FOR EACH DEVICE WHICH CAN INCLUDE CONTROL OF THE DEVICE.

OUTPUT PORT ASSIGNMENTS

OP10	INT CONTROL
11	CONTROL PORT
12	CONTROL PORT
13	CONTROL PORT
14	PAPER TAPE PUNCH
15	CARD PUNCH
16	DR. SUDING'S TVT
17	TTY SEND DATA UART PARALLEL
20	
21	FANCY GRAPHICS DISPLAY
22	
23	
24	SET RELAYS
25	SELECTIVELY CLEAR SW REG.
26 - 27	CALCULATOR
31-32	IC TESTER
34-35	FLOPPY DISK
36-37	IC TESTER

INPUT FLAG PORT ASSIGNMENTS

IN0 FLAG AND INTERRUPT
BIT 7 - 1 RESERVED FOR INTERRUPT CONTROL FOR THOSE WHO NEED IT.
BIT 0 SERIAL TTY FLAG

IN1 FLAG PORT ONE
BIT 7 - 1 PRESENTLY UNASSIGNED OR FOR PARALLEL CASSETTE
BIT 0 DR. SUDINGS'S CASSSETTE TAPE IN

OUPUT CONTROL PORT ASSIGNMENTS

OUT 11 CONTROL PORT 1
BIT 7 - 1 PRESENTLY UNASSIGNED OR RESERVED FOR PARALLEL CASSET
BIT 0 DR. SUDING'S CASSETTE OUT

OUT 12 CONTROL PORT 2
BITS 7 - 2 UNASSIGNED
BIT 1 PTR READ CHARACTER (IF MOTOR CONTROLLED)
BIT 0 SERIAL TTY OUT

IN3 FLAG PORT 3

BIT 7 KEYBOARD KEYPRESSED FLAG
6 TVT DATA RECEIVED FLAG
2-5 UNASSIGNED
1 PARALLEL TTY SEND DONE FLAG
0 PARALLEL TTY WORD RECEIVED FLAG

OUT 13 CONTROL PORT 3

BIT 7 THRU 1 UNASSIGNED
BIT 0 SERIAL OR PARALLEL TTY
TAPE READER CONTROL

THE STANDARDIZATION REPORT WAS SENT OUT JAN 10, 1975. IN THE FOUR MONTHS SINCE, MUCH HAS HAPPENED THAT HAS A BEARING ON PROPOSALS MADE.
1) ADDITIONAL SYSTEMS (I.E. INTELLEC-8 AND DEC'S MPS MODULES, ETC. HAVE BEEN INTRODUCED THAT WRECK HAVOC WITH PREMISES BEHIND WHICH PORT ASSIGNMENTS WERE MADE.
2) THE MIL MONITOR HAS COME AND GONE. BOB COOK HAS WRITTEN A KEYBOARD MONITOR THAT IS DIRECTLY USEABLE WITH HIS CREED TTY'S. TERRY RITTER HAS HIS EXECUTIVE MONITOR (FOR BAUDOT TTY) RUNNING.
3) 2102 MEMORY, 1702A PROM'S, 5202 AND 5203 PROM'S HAVE COME DOWN TREMENDOUSLY IN PRICE MAKING LARGE MODIFIABLE KEYBOARD MONITORS PRACTICAL.

OPINIONS OF THOSE THAT SENT RESPONSES TO THE STANDARDIZATION REQUEST.

RESPONSE TO THE PROPOSAL WAS NOT AS GREAT AS WAS HOPED FOR BUT THOSE REPLYING DID MAKE EXCELLENT POINTS. THESE COMMENTS FOLLOW:

LARRY PLESKAC, 938 PAULA ST., ESCONDIDO, CA 92027 SUGGESTS THAT IT IS OVERLY AMBITIOUS TO ASSIGN I/O PORTS FOR EQUIPMENT WHICH MOST PEOPLE HAVE NOT USED. SINCE CASSETTES ARE NOT RANDOM MEMORIES, HE THINKS TWO UNITS WHOULD BE APPROPRIATE AND WANTS A STANDARD CASSETTE FORMAT. HE POINTS OUT THE OMISSION OF A REAL TIME CLOCK (SINCE ADDED TO THE LIST) AND SUGGESTS THAT THOSE PEOPLE INTERESTED IN GAMES WILL NEED A RANDOM NUMBER GENERATOR WHICH SHOULD BE DONE WITH HARDWARE RATHER THAN SOFTWARE BECAUSE IT USES TOO MUCH MEMORY WITH SOFTWARE. HE SAYS THAT ONE REASON THAT WE HAVE HAD NO PROPOSALS FOR I/O STANDARDIZATION IS THAT PEOPLE AREN'T FAR ENOUGH ALONG AND THAT A GOOD STANDARD CASSETTE FORMAT WILL BENEFIT EVERYONE.

DALE BERGGREN, 9207 S.W. 43RD AVE., PORTLAND, OR 97219 HAS OPINIONS ALSO BASED ON BIG COMPUTER EXPERIENCE. HIS SUGGESTIONS: 1) SWITCH OR JUMPER SELECTION OF PERIPHERAL PORTS. 2) MAKE HARDWARE DO THE WORK AND KEEP SOFTWARE SIMPLE. AVOID SOFTWARE TIMING LOOPS, KEEP PERIPHERALS ASYNCHRONOUS AND AVOID CPU WAIT ON PERIPHERALS. 3) KEEP CONVERSIONS EXTERNAL TO THE CPU (EXCEPT POSSIBLY BAUDOT/ASCII). USE CONTROLLERS FOR INTERFACING DEVICES SO ONE SOFTWARE ROUTINE CAN BE USED FOR SEVERAL DEVICES BY CHANGING DEVICE ADDRESSES. 4) TRY TO KEEP THE "STANDARD" DEVICES ON REGULAR I/O PORTS AND KEEP THE SPECIAL ONES ON MULTIPLEXED PORTS. 5) TRY TO PUT INPUT AND OUTPUT FOR EACH DEVICE ON LIKE NUMBERED I/O PORTS AND RESERVE PORT NUMBERS TO CORRESPONED TO INTERRUPT NUMBERS. HE FAVORS SCRAPING THE PORT SCHEME ALTOGETHER AND IMPLEMENTING A DEVICE NUMBERED UNIVERSAL BUS IDEA. CONTACT HIM IF YOUR INTERESTED IN PURSUING THIS LINE OF ATTACK. 6) TRY TO DEFINE STANDARDS RATHER THAN TRY TO REACH AGREEMENT ON HARDWARE DESIGN, I.E. 800 BPI, PHASE ENCODED, RS232C, ETC.

ROBERT SWARTZ, 195 IVY LAND, HIGHLAND PARK, IL 60035 DOSEN'T LIKE THE PORT ASSIGNMENTS SINCE THEY DON'T MATCH UP WITH THE INTELLEC-8 OR MIL'S MOD-8. (I THINK THE TTY ASSIGNMENTS ARE THE SAME AS FOR THE MIL MOD-8.) THE UPWARD COMPATIBILITY OF THE MOD-8 TO 8080'S AND THE 2K MONITOR-8 ROM ARE IMPORTANT REASONS TO RETAIN MOD-8 PORT CONFIGURATIONS. A CHEAP PROM PROGRAMMER IS AVAILABLE ON THE MIL MOD-8 BACKPLANE ($22 PLUS $40 TO STUFF IT). THE MOD-8 USES OUT10 0-7, OUT 11 0-7, OUT13 1&2, INP1 0-7 FOR FOR THE PROM PROGRAMMER AND OUT12 BIT 0 FOR TTY OUT, OUT13 B0 FOR TTY READER CONTROL AND INP3 BIT0 FOR TTY SERIAL IN. HE THINKS A STANDARD SYSTEM SHOULD FEATURE 1) 8008 TO 8080 UPWARD COMPATIBILITY. 2) GOOD MECHANICAL CONSTRUCTION WITH BOARD EDGE CONNECTORS. 3) A GOOD BUFFERED BUS DESIGN. & 4) SYSTEM SETUP THAT DOES NOT REQUIRE A SCOPE.
(NOTE BOB'S POINTS WERE MADE LONG BEFORE MIL'S BANKRUPTCY.)

CPT. MACK L. WARD, 17 NUMBER ST., FT. BRAGG, NC 28307 SAYS HE IS COMPLETELY SATISFIED WITH THE PROPOSAL AS IT IS.

WILLIAM SEVERENCE, CENTER LOVELL, MN 04016, (207)925-2271 SAYS THAT MUCH OF HIS THINKING IS GEARED TO LARGE MACHINES BECAUSE OF PAST EXPERIENCE. HE EXPECTS TO DO EXTENSIVE SOFTWARE DEVELOPMENT INVOLVING MUCH FILE I/O AND IS IN FAVOR OF AS ADVANCED AN I/O STRUCTURE AS POSSIBLE, WITH AS MUCH WORK DONE BY HARDWARE AS POSSIBLE SUCH AS SERIAL TO PARALLEL CONVERSION. HE AGREES WITH MULTIPLEXING PORT SEVEN AND WANTS DEVICE ACTIVITY HANDLED BY A PRIORITY INTERRUPT SYSTEM USING PORT 0 AS DESCRIBED IN MP PUBLISHING'S ECS-5 ARTICLE. HE IS IN FAVOR OF USING THE MP PUBLISHING TECHNIQUE OF SENDING OUT A CONTROL WORD AND INPUTTING A STATUS WORD IN A SINGLE INSTRUCTION. HE ALSO THINKS THAT A STANDARD CASSETTE FORMAT IS THE MOST DIFFICULT BUT MOST IMPORTANT STANDARD TO AGREE ON AND INSISTS ON USING A UART HARDWARE IMPLEMENTATION. AGAIN HE IS IMPRESSED WITH THE ECS-6 AND ECS-7 TAPE CONTROLLER. HE SUGGESTS A BLOCKED TAPE FORMAT OF 256 WORDS WITH AUTOMATIC MOTOR CONTROL. THE IN4 BIT 7 KEYPRESSED FLAG AND IN3 BIT 7 FLAGS ARE REDUNDANT. INO COULD ALSO OUTPUT AN INTERRUPT CONTROL WORD MAKING OUT10 UNNECESSARY AND ALLOWING ITS USE FOR THE LED DISPLAY REGISTER. HE FAVORS USE OF PROM'S FOR A BOOTSTRAP CASSETTE LOADER AND AN ODT WHICH WOULD BE NICE BUT NOT NECESSARY IF YOU HAVE AN OCTAL KEYBOARD ENTRY SYSTEM. HE MENTIONS THAT SOFTWARE FORMAT STANDARDIZATION IS AS IMPORTANT AS HARDWARE AND THAT INTEL'S FORMAT BE FOLLOWED EXACTLY. HE SUGGESTS OCTAL FOR ALL NUMBERS EVEN THOUGH HEX MIGHT BE LESS AWKWARD FOR 8 BIT WORDS SINCE HE INTENSLY DISLIKES HEX NOTATION.

TERRY RITTER, 2524B GLEN SPRINGS WAY, AUSTIN, TX (512) 441-0036 SAYS THAT US STANDARDIZERS ARE ONLY A SMALL PORTION OF THE 8008 OWNERS. MOST HAVE THE INTEL PORT CONFIGURATION WIRED IN AND MOST DO NOT HAVE THE TV TYPEWRITER. IT IS THUS REASONABLE TO PLACE THE EXPECTED SMALL SYSTEM USES ON THESE PORTS: INPUT PORTS 0--ASCII KEYBOARD 1--CASSETTE OUTPUT PORTS 0--DISPLAY 1--CASSETTE 2--VIDEO 3--SPARE 4--TTY. MORE STANDARDIZATION THAN ABOVE MIGHT DO MORE HARM THAN GOOD. TWO VERY POWERFUL HARDWARE ADDITIONS, A PUSH/POP STACK, AND PROGRAM COUNTER ACCESS MIGHT BE INCLUDED AND USE FOUR INPUT PORTS BETWEEN THEM BUT PROVIDE THE ONLY KNOWN MEANS FOR PROVIDING THE 8008 WITH TRUE INTTERRUP AND MACHINE-LANGUAGE TRACE CAPABILITIES. IT IS IMPOSSIBLE TO HARD STANDARDIZE ANY DEVELOPING SYSTEM WITHOUT RESTRICTING ENGINEERING OPTIONS. FOR EXAMPLE, THE AFSK (RTTY) CASSETTE STORAGE SYSTEM MAY BECOME WIDELY USED YET ALTERNATE SYSTEMS WILL SOON APPEAR WITH MUCH GREATER STORAGE RATES, AND WE WILL AGAIN HAVE STANDARDIZATION PROBLEMS. IF POSSIBLE, MULTIPLE OPTIONS SHOULD BE COMPLETELY SPECIFIED, RATHER THAN STANDARDIZED.

J. PAUL FARR, 3723 JACKSTADT, SAN PEDRO, CA 90731 OBJECTS TO THE LARGE NUMBER OF PORTS DEDICATED TO SERIAL DATA DEVICES, WITH AN ATTENDENT SOFTWARE SERIAL TO PARALLEL CONVERSION. IT SEEMS THAT WITH A PROCESSOR AS SLOW AS THE 8008 AND WITH THE LIMITED MEMORY MOST OF US CAN AFFORD, THAT SERIAL DATA HANDLING BY THE CPU SHOULD BE AVOIDED AS MUCH AS POSSIBLE. HE LIKES THE IDEA OF USING THE 8-INPUT PORT MODIFICATION SUGGESTED BY MR. TITUS IN R-E WITH PORT IN-7 BEING USED AS A BUS. WE MAY WANT TO BE A LITTLE MORE JUDICIOUS IN ALLOCATING INPUT PORTS IN-0 THRU IN-6 AS THESE ARE ADDRESSED BY THE SIMPLE ONE BYTE INP INSTRUCTION. MAYBE ONE OR TWO CAN BE USED FOR FLAGS, ONE FOR KEYBOARD, AND TWO OR THREE FOR BULK DATA AND PROGRAM STORAGE ON TAPE OR DISK. ON THE ASSIGNMENT OF OUTPUT PORTS, WE MAY WANT TO THINK IN TERMS OF MAKING 2 OF THE 24 PORTS INTO AN OUTPUT BUS, ONE PORT THE ACTUAL 8 BIT OUTPUT AND THE OTHER PORT AN 8 BIT DEVICE SELECT (256 POSSIBLE). HE SAYS THAT DON TARBELL HAS CAUTIONED HIM AGAINST NOT ALLOWING FOR ENOUGH OUTPUT CONTROL PORTS. DISK DRIVES AND OTHER PERIPHERALS REQUIRE QUITE A FEW BITS OF CONTROL, EVEN AUTOMATIC CONTROL OF A CASSETTE OR TWO CAN USE UP HALF OF AN OUTPUT PORT. HE AGREES WITH THE IDEA THAT LOTS OF PERIPHERALS ARE NEAT BUT DOESN'T NECESSARILY THINK NUMEROUS PERIPHERALS ARE REALLY NECESSARY. DR. SUDING HAS DONE ONE HECK OF A LOT OF WORK WITH NEARLY NONE AND NOT TOO MUCH MEMORY EITHER. PAUL IS USING THE 256 WORD ODT IN PAGE 0 AND THINKS THIS IS A FANTASTIC TOOL FOR PROGRAM DEVELOPMENT AND GENERAL MARK-8 OPERATION FROM THE KEYBOARD. HE WOULD LIKE TO SEE THIS PROGRAM BECOME THE STANDARD SOFTWARE COMPONENT OF ALL USER GROUP MACHINES.

LAURENCE PLATE JR., 2320 SKYLINE WAY, SANTA BARBARA, CA 93109 SAYS THE KEYPRESSED FLAG SHOULD BE ASSIGNED ELSEWHERE AND IN4 BIT 7 RESERVED FOR PARITY AS HE HAS HAD EXPERIENCES WITH PARITY PROBLEMS IN THE PAST AND WANTS TO RETAIN THE PARITY BIT FOR HIS TVT WHICH WILL EVENTUALLY CONTAIN PARITY BIT LOGIC. THE INPUT PORT ASSIGNMENTS SEEM TO BE CROWDED, HENCE IT MAY BE WISE TO ADD ONE OR TWO MORE PORTS TO BE MULTIPLEXED AND ASSIGN THE FLOPPY DISK TO THAT PORT AND LET THE REST OF THE ASSIGNMENTS STAND FOR FUTURE NEEDS. HE SAYS THAT NATIONAL HAS A ROM CHIP THAT DOES BAUDOT TO ASCII CONVERSIONS (MM5220BL) AND TWO NEW CHIPS WHICH DO ASCII TO BAUDOT (MM3501TL AND MM5221TM). LARRY SAYS THAT HE ONCE DESIGNED A PAPER TAPE READER THAT USED A BLOCK OF ALUMINUM DRILLED FOR PHOTO CELLS AND THE SPROKET HOLE WAS USED TO TRIGGER RECEIVING OF THE DATA. HE SAYS WE NEED A MEMORY STANDARDIZATION SCHEME AND A NEW MEMORY LOGIC DESIGN TO ALLOW FOR 16K MEMORY. HE IS CONVERTING TO PLUGGABLE BOARDS AND SUPPLIED A CAREFULLY DRAWN TABLE OF THE MARK-8 BUS SIGNALS BOTH SOURCE AND DESTINATION WHICH WILL BE INCLUDED IN THE NEXT NEWSLETTER.

THE DIGITAL GROUP HAS PROBABLY DONE MORE FOR SYSTEM STANDARDIZATION THAN ANYONE BY PUBLISHING DR. SUDING'S MARK-8 MODIFICATIONS AND HIS CASSETTE TAPE RECORDER CIRCUIT. THEY HAD TO LOSE A BUNDLE ON THEIR $7.50 DOCUMENTATION PACKAGE. IF YOU HAVE SEEN IT, YOU KNOW WHAT I'M TALKING ABOUT. IN ANY CASE THIS IS ONE EXAMPLE OF WHAT THEY INTEND TO CONTINUE DOING IN THE FUTURE. THEY ASKED THAT WE INCLUDE THE LOAD AND DUMP ROUTINES FOR DR. SUDING'S CASSETTE CIRCUIT THAT WAS INCLUDED IN THE LAST NEWSLETTER. THEY NOTE THAT THE 5 VOLT ZENER WAS SHOWN BACKWARDS IN THE NEWSLETTER COPY OF THE CIRCUIT.

PROGRAM: CASSETTE DUMPER FOR COLD START - SHORT FORM

OCTAL ADDRESS	OCTAL CODE	OPERATION	OCTAL ADDRESS	OCTAL CODE	OPERATION
003000	056	Load H with 000	003030	016	Load B with 040
003001	000		003031	040	
003002	066	Load L with 000	003032	011	Decrement B
003003	000		003033	110	Jump not zero
003004	026	Load C with 010	003034	032	
003005	010		003035	003	
003006	036	Load D with 000	003036	021	Decrement C
003007	000		003037	110	Jump not zero
003010	103	Input 1	003040	024	
003011	044	AND A with 001	003041	003	
003012	001		003042	373	Store D in mem
003013	110	Jump if not zero	003043	060	Increment L
003014	010		003044	110	Jump not zero
003015	003		003045	004	
003016	016	Load B with 060	003046	003	
003017	060		003047	050	Increment H
003020	011	Decrement B	003050	305	Load A with H
003021	110	Jump not zero	003051	074	Compare A with 004
003022	020		003052	004	
003023	003		003053	110	Jump not equal
003024	103	Input 1	003054	004	
003025	203	Add D to A	003055	003	
003026	012	Shift right	003056	000	Halt
003027	330	Load D with A			

COMMENTS: This routine is hand keyed into the upper portion of the 1K 8008 microprocessor when power is first applied. The program deserializes the output of the cassette, and loads the 8-bit bytes into memory starting at byte Ø. The speed is approximately 40 bytes/second (1K in 25 sec.)

Begin this program by doing a Restart 025 while the cassette is playing the constant tone leader prior to the data portion. The timing constants at 003017 and 003031 assume the 20μs cycle time of the Mark-8 (use of a 4Mhz crystal).

PROGRAM: CASSETTE LOADER (loads storage contents onto cassette)- SHORT FORM

OCTAL ADDRESS	OCTAL CODE	OPERATION
003200	006	Load A with 001
003201	001	
003202	123	Out 1
003203	125	Out 2
003204	026	Load C with 377
003205	377	
003206	016	Load B with 377
003207	377	
003210	011	Decrement B
003211	110	Jump not zero
003212	210	
003213	003	
003214	021	Decrement C
003215	110	Jump not zero
003216	206	
003217	003	
003220	056	Load H with 000
003221	000	
003222	066	Load L with 000
003223	000	
003224	036	Load D with 003*
003225	003*	
003226	046	Load E with 377
003227	377	
003230	026	Load C with 011
003231	011	
003232	302	Load A with C
003233	022	Rotate left thru car.
003234	307	Load A from memory
003235	022	Rotate left thru car.
003236	123	Out 1
003237	016	Load B with 040
003240	040	
003241	011	Decrement B
003242	110	Jump not equal
003243	241	
003244	003	
003245	032	Rotate rht thru car.
003246	021	Decrement C
003247	110	Jump not zero
003250	236	
003251	003	
003252	006	Load A with 001
003253	001	
003254	123	Out 1
003255	016	Load B with 100
003256	100	
003257	011	Decrement B
003260	110	Jump not zero
003261	257	
003262	003	
003263	305	Load A with H
003264	273	Compare A with D
003265	150	Jump if equal
003266	300	
003267	003	
003270	060	Increment L
003271	110	Jump not zero
003272	230	
003273	003	
003274	050	Increment H
003275	104	Jump unconditional
003276	230	
003277	003	
003300	306	Load A with L
003301	274	Compare A with E
003302	150	Jump if equal
003303	311	
003304	003	
003305	060	Increment L
003306	104	Jump unconditional
003307	230	
003310	003	
003311	026	Load C with 377
003312	377	
003313	016	Load B with 177
003314	177	
003315	011	Decrement B
003316	110	Jump not zero
003317	315	
003320	003	
003321	021	Decrement C
003322	110	Jump not zero
003323	313	
003324	003	
003325	220	Clear A
003326	125	Out 2
003327	000	Halt

COMMENTS: *Set byte 003225 to the address of the highest byte page in your system:

1K = 003 (shown)
1.5K = 005
2K = 007

Begin this program by doing a Restart 015 after having placed the cassette in record and running clear of the leader.

DR. SUDING, C/O DIGITAL GROUP, PO BOX 6528, DENVER, CO 80206 RECOMMENDS STANDARDS FOR A FRONT PANEL AND POWER SUPPLY. HE SAYS A MEANINGFULL FRONT PANEL SHOULD HAVE DIGITAL READOUT OF HIGH AND LOW ADDRESS, MEMORY DATA, AND ONE OUTPUT PORT. IT SHOULD HAVE KEYBOARD ENTRY WITH OCTAL DATA ENTRY, INTERRUPT, EXAMINE & DEPOSIT KEYS, A DEPOSIT ENABLE TOGGLE SWITCH, LOAD HIGH, LOAD LOW ADDRESS, RUN AND STOP KEYS, A DIGITAL READ-OUT OF THE OCTAL ENTRY, A POWER SWITCH AND A POWER ON INDICATOR. THE POWER SUPPLY SHOULD BE CAPABLE OF +5 AT LEAST 5 AMPS, -9 V @ 1 AMP MINIMUM, BOTH WITH OVERVOLTAGE PROTECTION, + OR - 12 VOLT SUPPLIES FOR OP AMP USE AND A FAN FOR COOLING. DR. SUDING THINKS THAT TWO PORTS SHOULD BE RESERVED FOR ALL THE MISCELLANEOUS APPLICATIONS. IMPORTANT DEVICES SHOULD RECEIVE PERMANENT ASSIGNMENTS AS FOLLOWS:
1) INPUT KEYBOARD - ASCII, 7 BITS WITH 8TH BIT FOR STROBE, INPUT PORT 0 10 PIN CONNECTOR TO INCLUDE GND & +5 FOR KEYBOARD LOGIC.
2) TV READOUT, BNC CONNECTOR TO VIDEO OUTPUT AND USE OF OUT PORT 6
3) CASSETTE INPUT & OUTPUT, INPUT PORT 1 BIT 0 AND OUTPUT PORT 1 BIT 0, SERIALIZE AND DESERIALIZE UNDER SOFTWARE CONTROL.
4) TTY - IF SERIAL, SHARE PORT 1 WITH CASSETTE, IF PARALLEL, THEN PORT 2 INPUT AND OUTPUT.
5) CALCULATOR INTERFACE, USE INPUT PORT 6 AND OUTPUT PORT 7.
6) MISC. I/O CAN BE RANDOMLY ASSIGNED TO PORTS 3 & 4.
7) GRAPHICS OPERATION (OSCILLOSCOPE, TV VECTOR/RASTER GRAPHICS GENERATOR & LIGHT PEN) ON PORT 5 I/O.
DR. SUDING SUGGESTS FORGETTING PAPER TAPE COMPLETELY & USING CASSETTE AND STAYING AWAY FROM KEY PUNCHES.

RAYMOND G. STEVENS, RGS ELECTRONICS, 3650 CHARLES ST., SUITEK, SANTA CLARA, CA 95050, (408) 247-0158 SAYS THAT ALL THE MODIFICATIONS TO THE MARK-8 I/O CURRENTLY BEING MADE ARE SLOWLY BUT SURELY MAKING IT MORE LIKE THE RGS 008-A I/O AT THE EXPENSE OF GREAT COMPLICATION AND EXPENSE TO THE EXPERIMENTER. IF HE COULD COUNT ON SELLING ENOUGH UNITS, HE WOULD DEVELOP A CARD THAT WOULD CONVERT THE MARK-8'S PORT STYLE I/O INTO THE 008A'S UNIVERSAL BUS I/O.

J. A. TITUS, TYCHON, INC., PO BOX 242, BLACKSBURG, VA 24060 (703) 951-9030 THINKS THAT THE ODT SHOULD NOT BE IN THE BASE PAGE SINCE IT WOULD BE IMPOSSIBLE TO DEBUG PROGRAMS USING THIS AREA. IT SHOULD BE PUT UP HIGH IN MEMORY AND A RESTART LOCATION USED TO GET TO IT. A STANDARD-IZED PRIORITY INTERRUPT SCHEME SHOULD BE DEVELOPED. HE HAS CONSTRUCTED A PAPER TAPE READER USING A LEDEX STEPPING SWITCH DRIVE AND H-38 MATCH-STICK TI PHOTODIODES AND WILL PROVIDE A CONSTRUCTION PACKET AS PART OF OUR PROJECT ASSIGNMENT PROGRAM TO BE DESCRIBED LATER. ANYONE DEVELOPING AN INTERFACE DESIGN SHOULD OVER DESIGN IT BY PROVIDING ALL NECESSARY FLAGS AND PULSES THAT COULD BE POSSIBLY NEEDED SO IT CAN BE USED WITH A WIDE VARIETY OF CPU SYSTEMS. EVEN IF ALL THE SIGNALS ARE NOT USED, THEY SHOULD BE AVAILBLE, OR AT LEAST DOCUMENTED. HE SAYS NO ONE HAS MENTIONED USE OF ASYNCHRONOUS COMMUNICATIONS BETWEEN PERIPHERALS AND REMOTE COMPUTERS. THIS IS A USEFUL TECHNIQUE AND SHOULD BE MADE AWARE OF IT IF THEY ARE USING ANY REMOTE SENSORS OR DIGITAL DATA SOURCE. HE ALSO SUGGESTS THAT WE LOOK AT THE STANDARD INTERFACE THAT HEWLETT-PACK-ARD IS TRYING TO GET ADOPTED BY THE ANSI. THIS IS A 16 LINE PARALLEL INTERFACE THAT USES EIGHT LINES FOR ADDRESS AND DATA AND EIGHT LINES FOR FLAGS, ETC. IT WAS REVIEWED IN "ELECTRONICS", NOV 14, 1974, PAGES 95-106. HE SUGGESTS THAT ANY INTERFACE OR DEVICE SUBMITTED FOR USE BY OTHER PARTICIPANTS MUST BE THOROUGHLY TESTED BY ANOTHER INDEPENDENT GROUP SO THAT BAD IDEAS AND MARGINAL DESIGNS DON'T CREEP IN THAT COULD CAUSE A LOT OF DISAPPOINTMENT AMONG USERS, MOST OF WHOM ARE ON A LIMITED HOBBY BUDGET. WHEN APPROVAL IS FINAL, EACH GROUP SHOULD SUBMIT COPY-READY ARTWORK FOR REPRODUCTION.

NAT WADSWORTH, PRESIDENT, SCELBI COMPUTER CONSULTING, INC., 1322 READ-
BOSTON POST ROAD, MILFORD, CT 06460 (203) 874-1573 SAYS THAT TO AT-
TEMPT TO STANDARDIZE ON THE USE OF SELECTED DEVICES FOR SELECTED
PORTS HANDICAPS THE LESS ENDOWED USER, I.E. THOSE WITH LESS OPERATING
I/O PORTS AND ESSENTIALLY NEGATES ONE OF THE POWERFUL ASPECTS OF A
COMPUTER - THE ABILITY TO ACCOMODATE HARDWARE VARIATIONS BY SUBSTI-
TUTING EASILY CHANGED SOFTWARE. INSTEAD OF ATTEMPTING TO STANDARD-
IZE DEVICE ASSIGNMENTS, HE THINKS IT WISER TO STANDARDIZE ON SOFTWARE
PROCEDURES, SUCH AS ESTABLISHING FORMATS FOR SUBROUTINING, SO THAT THE
NUMBER OF ACTUAL SOFTWARE CHANGES (GENERALLY TO SELECT THE APPROPRIATE
I/O PORT CODES) WOULD BE MINIMIZED AND LOCALIZED WITHIN A LARGE PRO-
GRAM. A WELL DESIGNED PROGRAM NEED GENERALLY ONLY CALL ONE OR TWO I/O
SUBROUTINES THAT ACTUALLY CONTAIN PORT DEFINING I/O INSTURCTIONS AND IT
IS A SIMPLE MATTER FOR A USER TO DEFINE THE PORTS FOR THE INDIVIDUAL'S
HARDWARE FACILITY. AN AREA MORE SUITABLE TO STANDARDIZATION WOULD BE
GUIDELINES TO ESTABLISH BIT POSITION ASSIGNMENTS FOR I/O DEVICES, I.E.
A CONVENTION SUCH AS: A) AN OUTPUT DEVICE USING TWO PORTS, ONE FOR
DATA AND ONE FOR CONTROLS, SHOULD HAVE DATA ON THE LOWER VALUE
PORT, CONTROL SIGNALS ON THE NEXT HIGHER PORT. B) AN OUTPUT DEVICE
USING ONE PORT FOR DATA AND CONTROLS SHOULD HAVE CONTROL LINES CONNECT-
ED TO THE MOST SIGNIFICANT BITS, DATA ON THE LEAST SIGNIFICANT BITS.
C) POSSIBLY RECOMMEND BIT ASSIGNMENTS FOR SERIAL I/O DEVICES SUCH AS
B0 FOR OUTPUTTING DATA, B7 FOR INPUTTING DATA. IN GENERAL, WE SHOULD
WORK TOWARDS STANDARDIZATION OF SOFTWARE TECHNIQUES THAT WILL REDUCE THE
WORK INVOLVED IN ADAPTING A PROGRAM TO AN INDIVIDUAL'S PHYSICAL SETUP
WHILE STILL PROVIDING THE INHERANT FLEXIBILITY THAT IS THE GREAT ASSET
OF A COMPUTER WHILE AVOIDING ATTEMPTS TO STANDARDIZE ON PHYSICAL HARD-
WARE WHICH OFTEN NECESSITATES MATERIAL EXPENSE. AS A GENERAL RULE,
A HOBBYIST IS LOOKING TO KEEP FINANCIAL EXPENSE TO A MINIMUM, BUT
CONVERSLY, HAS THE TIME AND INTEREST, TO MAKE SOFTWARE CHANGES WHICH
CAN GET AROUND THE HARDWARE LIMITATIONS. THAT, INDEED, IS ONE REASON
A COMPUTER HOLDS SUCH ATTRACTION!

CONCLUSIONS

IT SEEMS THAT WE ARE INDEED TOO FAR ALONG TO PRODUCE THE "SYSTEM" TYPE OF STANDARDIZATION THAT WOULD HAVE BEEN NICE. EVERY-ONE'S DEVELOPMENT WORK HAS HEADED IN A DIFFERENT DIRECTION AND OUR ONLY HOPE NOW IS TO HOP ONTO SOMEONE'S BANDWAGON THAT HAS DONE IMPORTANT DEVELOPMENT WORK AND USE HIS I/O CONFIGURATION. THE DIGITAL GROUP AND THE COMPUTER HOBBYIST GROUP ARE BOTH COMMITTED TO HIGH QUALITY DESIGN AND DOCUMNENTATION IN THE HOPE OF ATTRACTING A FOLLOWING IN THEIR RESPEC-TIVE DIRECTIONS.

IT SEEMS THAT THE GOAL OF PRODUCING THE $500 COMPLETE HOBBY COMPUTER SYSTEM IS WHAT WE WOULD LIKE TO STRIVE FOR. AT THE RISK OF HURTING SOME FEELINGS, I THINK WE MUST IGNORE THE DESIRES OF THE "BIG COMPUTER BOYS" THAT WANT TO MAKE AN 8008 INTO AN IBM 370. TO THIS END WE MUST:

1) DO EVERYTHING POSSIBLE WITH SOFTWARE RATHER THAN HARDWARE. MEMORY IS GETTING CHEAPER AND IT IS EASY TO STUFF MEMORY BOARDS. ONCE SOME MEM-ORY IS WORKING, ITS EASY TO LET THE COMPUTER CHECK OTHER MEMORY BOARDS. A HOBBYIST HAS TIME TO MAKE SOFTWARE CHANGES AND DO SOFTWARE DEVELOPMENT (INDEED THAT MUST BE ONE OF THE REASONS HE BUILD THE SYSTEM IN THE FIRST PLACE) BUT HE DOSEN'T NECESSARILY HAVE THE MONEY AND OFTEN TIMES DOES NOT HAVE THE KNOWLEDGE TO GET EXOTIC HARDWARE SCHEMES CONSTRUCTED AND DEBUGGED.

2) INTERRUPTS HAVE NO PLACE IN THE SMALL HOBBY SYSTEM. WITH SMALL MEM-ORY SIZE, THE LACK OF CAPABILITY FOR DOING INTERRUPTS WITHOUT EXTENSIVE HARDWARE ADDITIONS IN AN 8008, AND WITH INEXPERIENCED PROGRAMMERS, IT WILL BE NEARLY IMPOSSIBLE TO ACCOMPLISH ANYTHING WITH INTERRUPTS ANY-WAY. THEY AREN'T REALLY NEEDED, ADD EXTRA EXPENSE, SO WHY TRY TO IN-CLUDE THEM.

3) WITH A GOOD KEYBOARD MONITOR, THE HOBBYIST IS WASTING HIS MONEY AND A GOOD DEAL OF TIME TRYING TO INCLUDE A FRONT PANEL. A PROM WITH A KEYBOARD MONITOR AND AN INTERRUPT PUSHBUTTON ARE ALL THAT IS REALLY NECESSARY.

THE STATUS OF PERIPHERALS TO DATE IS AS FOLLOWS:
1) TERMINALS A) TVT-1 LOTS AROUND, SCROLLING MODS AVAILABLE, ALL ERRORS HAVE BEEN FOUND BUT PROBABLY NOT THE BEST DESIGN TO START NOW. B) TVT-2 NICE DESIGN, FAIR PRICE, KIT AVAILABLE FROM SWTP, PC BOARDS AVAILABLE FROM SWTP, IC PARTS KIT AVAILABLE FROM MINI MICRO MART. C) SUDING 8X32 TVT, $95 KIT AVAILABLE FROM DIGITAL GROUP (SEND SASE FOR DETAILS) D) SUDING 16X64 TVT -- STATUS UNCERTAIN, CONTACT DIGITAL GROUP FOR DETAILS E) CREED TTY'S SEE NL#5
2) KEYBOARD MONITORS A) LAWRENCE LIVERMORE LABS 256 WORD ODT WRITEUP UCID-16507 AVAILABLE FROM US ATOMIC ENERGY COMMISSION, DIV. TECHINICAL INFO., OAK RIDGE, TN. B) MIL MONITOR-8 ROM'S MAY EXIST BUT NOT LIKELY. WRITEUP AVAILABLE IN MIL MF8008 MANUAL BUT THEY ARE TOUGH TO GET. C) BOB COOK HAS A CREED TTY KEYBOARD MONITOR.
3) CASSETTE TAPE UNIT ONLY TWO UNITS APPEAR IN THE RUNNING NOW. AT LEAST SEVEN THAT WORK ARE PRESENTLY AVAILABLE. A) THE SUDING DIGITAL GROUP UNIT IS POPULAR, IS BEING PUSHED HARD AS A STANDARD BY THE DIGITAL GROUP, A PC BOARD IS AVAILABLE FOR $4.00, A PARTS KIT FOR $19.00 AND AN ASSEMBLED AND TESTED UNIT FOR $24.00.
B) THE COMPUTER HOBBYIST GROUP DESCRIBED A CASSETTE UNIT THAT THEY INTEND TO PROMOTE AND SUPPORT IN THE LATEST ISSUE OF THE COMPUTER HOBBYIST. THEY WILL HAVE PC BOARDS, PARTS KITS, AND SOFTWARE AVAILABLE. C) THE MIL CASSETTE STILL LOOKS GOOD BUT WITHOUT MONITOR-8 ROMS, IT WILL NOT BE SUPPORTED. THE NICE PART ABOUT THE CASSETTE PICTURE IS THAT ALL OF THESE INTERFACES ARE CHEAP ENOUGH SO A GUY CAN BUILD ONE OF EACH IF HE WANTS TO.
4. PAPER TAPE READERS - MR. TITUS HAS PROMISED US A WRITEUP ON HIS AND AS SOON AS I GET CAUGHT UP, I'LL WRITE A CONSTRUCTION ARTICLE FOR MINE.
5. PAPER TAPE PUNCH - THE CREED TTY'S INCLUDE A 5 LEVEL PUNCH AND THE CREED MONITOR CONTAINS DUMP AND LOAD ROUTINES.
6 THRU 7 NO NEW INFO.
8. GRAPHICS TERMINALS - SEE THE COMPUTER HOBBYIST, ISSUES 1,2, & 3 FOR COMPLETE CONSTRUCTION INFO ON AN ELABORATE UNIT. DR. SUDING IS GOING TO DEVELOP A RASTER SCAN TV UNIT WITH LIGHT PEN.
9 THRU 11 NO NEW INFO.
12. CALCULATOR INTERFACE - DR. SUDING'S DESIGN IS COMPLETE AND AVAILABLE FROM MINI MICRO MART. SEE BACK OF NL FOR INFORMATION.
13. PROM PROGRAMMER - AN EARLY EDITION OF THE INTEL 8008 DATA BOOK INCLUDED COMPLETE DESIGN INFORMATION FOR A PROM PROGRAMMER. THE MIL MOD-8 BACKPLANE BOARD (STILL AVAILABLE) HAS A PROM PROGRAMMER BUILT IN THAT REQUIRES ABOUT $40.00 IN PARTS.
14 THRU 18 NO NEW INFO.

TO PUT SOME DIRECTION INTO PERIPHERAL DEVELOPMENT IT IS NECESSARY TO "ASSIGN" PROJECTS TO INDIVIDUALS. WE CAN'T REALLY ASSIGN PEOPLE SO WE ARE INSTEAD ASKING THAT YOU VOLUNTEER TO DEVELOP AND PRODUCE A CAREFULLY DOCUMENTED CONSTRUCTION PACKAGE FOR ONE OF THE PERIPHERALS ABOVE. IT MATTERS NOT AT ALL IF SEVERAL PEOPLE ARE WORKING ON THE SAME DEVICE. PERHAPS THEY CAN TEAM UP OR AT LEAST COMMUNICATE AND SHARE IDEAS. THESE PACKAGES WILL BE MADE AVAILABLE AT REPRODUCTION AND MAILING COSTS TO ALL PARTICIPANTS. ONE OF OUR SUPPLIERS CAN HELP MAKE PC BOARDS AND PARTS KITS AVAILABLE.

PLEASE WRITE & INDICATE WHICH PROJECT YOU ARE INTERESTED IN DEVELOPING. THE NEXT NEWSLETTER WILL CONTAIN A LISTING OF PROJECTS AND THOSE COMMITTED TO CONSTRUCTION PROJECT WRITEUPS.

ALTHOUGH WE CERTAINLY WANT TO DEVELOP 8008 PERIPHERALS, THE AREA OF GREATEST NEED IS PROBABLY FOR ALTAIR 8800 PERIPHERALS. THERE ARE AN ENORMOUS NUMBER OF PEOPLE THAT PROBABLY HAVE THE BASIC KIT AND THOUGHT THEY WOULD HAVE A RUNNING COMPUTER THAT WOULD DO SOMETHING USEFUL ONLY TO FIND OUT THAT THEY WOULD HAVE TO SPEND MANY HUNDREDS OF DOLLARS TO OBTAIN PERIPHERAL KITS AND SOFTWARE PACKAGES. ANY HELP WE CAN PROVIDE THESE PEOPLE WILL BE GREATLY APPRECIATED.

AN ALTERNATIVE TO AN 8080 SYSTEM

DR. MARK SEBERN, PROJECT LEADER, ULTRA LOW COST SYSTEMS, RESEARCH AND DEVELOPMENT GROUP, DIGITAL EQUIPMENT CORPORATION (DEC), 146 MAIN STREET, MAYNARD, MA 01754, (617)897-5111 EXT. 4413 (WA9JMS/WA1UOI) HAS BEEN A LONG TIME FOLLOWER OF THE MICRO-8 USER GROUP AND SENT DETAILED INFORMATION ON THE LSI-11. ALTHOUGH HE POINTS OUT THAT ITS NOT QUITE PRICED FOR THE HOBBYIST YET, HE THINKS WE'LL SEE HOW CLOSE THAT DAY REALLY IS. (WOW! WOULDN'T IT BE FUN TO SEE SOME OF THE PROJECTS THEY ARE WORKING ON FOR THE FUTURE IN MAYNARD.)

DEC'S LSI-11 IS A COMPLETELY COMPATIBLE PDP-11 (16 BIT MACHINE WITH AN INCREDIBLY VERSATILE INSTRUCTION SET) WITH 4K OF RAM ON A SINGLE 8.5" BY 10" BOARD. IT INCORPORATES A COMPLETE ASCII CONSOLE (ODT-11, I.E. KEYBOARD MONITOR) IN THE MICROCODE OF THE PROCESSOR WHERE IT CAN'T BE BOMBED, A 16 BIT I/O PORT (DMA PORT), POWER FAIL/AUTO RESTART, REAL TIME CLOCK INPUT, AUTOMATIC PRIORITY INTERRUPT ARBITRATION AND VECTORED INTERRUPT HANDLING AND SELLS FOR $990 FOR ONE, $653 FOR 50-99 AND $634 FOR 100-199. ONE WOULD HAVE TO ADD A BACKPLANE ASSEMBLY ($116 FOR 50-99) AND A POWER SUPPLY (+5 @ 3 AMPS AND +12 AT 1.5 AMPS MINIMUM) AND A TVT AND YOU HAVE A 4K PDP-11 BACKED BY THE DECUS USERS ORGANIZATION (175 PROGRAMS IN THEIR PROGRAM LIBRARY AND GROWING DAILY, FREE MEMBERSHIP, AND REASONABLE PROGRAM ACQUISITION COST) AND WITH RELIABLE SOFTWARE SUPPORT (AT A COST) BY DEC.

COMPARE THAT TO AN ALTAIR 8800. THE BASIC MACHINE IS NOW $550. YOU'D NEED 2 4K MODULES TO EQUAL THE 4K OF 16 BIT WORDS IN THE LSI-11 AT ABOUT $250 EACH. EVEN IF THE OTHER THINGS WERE AVAILABLE YOU'D HAVE ABOUT THE SAME MONEY INVOLVED AND LET'S FACE IT, AN 8080 IS A LONG WAY FROM BEING EQUAL TO A PDP-11.

ALL WE NEED NOW IS FOR SOMEONE TO PUT TOGETHER A PACKAGE AROUND THIS, GET DELIVERY ESTIMATES, AND COLLECT DEPOSITS FOR AT LEAST 50 AND YOU CAN HAVE YOUR VERY OWN PDP-11 FOR UNDER $1000! ADD ANOTHER 4K OF MEMORY AT $413 (FOR 50-99) AND YOU CAN RUN A SUPER BASIC.

WRITE DEC, COMPONENTS GROUP, MR2-2, ONE IRON WAY, MARLBOROUGH, MA 01752 FOR DETAILS OR CALL TOLL FREE, (800)225-9480, 8:30-5:30 EST. (MA RESIDENTS DIAL (617)481-7400).

FLASH: JUST RECEIVED A CALL FROM BOB ALBRECHT OF PEOPLE'S COMPUTER CO. (PCC), PO BOX 310, MENLO PARK, CA 94025. HE SAYS THEIR ORGANIZATION WOULD ENTERTAIN THE IDEA OF ACTING AS THE OEM (ORIGINAL EQUIPMENT MANUFACTURER) TO COLLECT AT LEAST 50 ORDERS TO OBTAIN THE QUANTITY PRICE IF ENOUGH PEOPLE ARE INTERESTED. IF YOU WOULD BE INTERESTED (SERIOUSLY), WRITE BOB AT PCC.

HAPPENINGS AT THE COMPUTER HOBBYIST MAGAZINE WORKSHIP

STEVE STALLINGS AND HAL CHAMBERLIN, COMPUTER HOBBYIST, BOX 295, CARY, NC 27511, (919)467-3145 OR (919)815-7223 (EVENINGS OR WEEKENDS) CALLED AND DESCRIBED YET ANOTHER CASSETTE UNIT THEY HAVE BEEN WORKING ON THAT WILL BE DETAILED IN THEIR MARCH ISSUE. IT'S BIT RATE IS 500 BITS/SEC, BIT ASYNCRONOUS WITH "HANDSHAKING" WITH THE CPU ON BOTH RECORD AND PLAYBACK ALLOWING IT TO WORK WITH ANY CPU CLOCK RATE. MODULATION IS PULSES WHICH ARE USED DIRECTLY REQUIRING NO PHASE LOCKED LOOP OR TUNED FILTERS. IT USES +5 VOLTS ONLY, ABOUT 8 IC PACKAGES, THEY HOPE TO BE ABLE TO SUPPLY A PC BOARD, AND THEY WILL SUPPORT IT WITH HARDWARE AND SOFTWARE AND RELEASE PROGRAMS TO TCH READERS. (AT FIRST WE HAD NONE, NOW WE HAVE SIX OR SEVEN CASSETTE UNITS THAT WORK. WHAT DO WE DO NOW?)

PLEASE SEND $6.00 FOR 12 MONTHLY ISSUES TO THE TCH GUYS. THEY DO A BEAUTIFUL JOB ON THEIR MAGAZINE, SELL IT FOR A BARGAIN PRICE, AND WOULD LIKE TO MAKE SOME MONEY. IF YOU SUPPORT THEM WITH A SUBSCRIPTION, PERHAPS THEY WILL DO A LITTLE BETTER THAN JUST BREAK EVEN.

THEY HOPE TO SEE SOME OF YOU AT THE DAYTON HAMFEST IN APRIL. THEY WILL BE THERE WITH A DEMO SYSTEM TO GENERATE INTEREST IN COMPUTERS AS A HOBBY AMONG THE HAMS.

NEW MEMORY COMPONENT JUST ANNOUNCED BY SIGNETICS

A DATA SHEET FOR A NEW MEMORY COMPONENT THAT WAS JUST ANNOUNCED BY SIGNETICS ON APRIL 1ST WAS SENT IN TO US BY WALTER M. WHITE, 343 S. MADISON AVE., PASEDENA, CA 91101. THE POTENTIAL USE OF THIS DEVICE IN HOBBY SYSTEMS SEEMS OF SUCH IMPORTANCE THAT THE FIRST PAGE OF THE DEVICE DATA SHEET IS INCLUDED IN THE APRIL ISSUE OF THIS NEWSLETTER FOR YOUR INFORMATION. WRITE YOUR LOCAL SIGNETICS DISTRIBUTOR FOR ADDITIONAL INFORMATION AND PRICING.

25120

FULLY ENCODED, QUADRI-PORT, RANDOM ACCESS WRITE-ONLY-MEMORY

FINAL SPECIFICATION(10)

DESCRIPTION

The Signetics 25000 Series 9046XN Random Access Write-Only-Memory employs both enhancement and depletion mode P-Channel, N-Channel, and neu(1) channel MOS devices. Although a static device, a single TTL level clock phase is required to drive the on-board multi-port clock generator. Data refresh is accomplished during CB and LH periods(11). Quadri-state outputs (when applicable) allow expansion in many directions, depending on organization.

The static memory cells are operated dynamically to yield extremely low power dissipation. All inputs and outputs are directly TTL compatible when proper interfacing circuitry is employed.

Device construction is more or less S.O.S.(2).

FEATURES

- FULLY ENCODED MULTI-PORT ADDRESSING
- WRITE CYCLE TIME 80nS (MAX. TYPICAL)
- WRITE ACCESS TIME(3)
- POWER DISSIPATION 10uW/BIT TYPICAL
- CELL REFRESH TIME 2mS (MIN. TYPICAL)
- TTL/DTL COMPATIBLE INPUTS(4)
- AVAILABLE OUTPUTS "n"
- CLOCK LINE CAPACITANCE 2pF MAX.(5)
- V_{CC} = +10V
- V_{DD} = OV ± 2%
- V_{FF} = 6.3V_{ac}(6)

APPLICATIONS

DON'T CARE BUFFER STORES
LEAST SIGNIFICANT CONTROL MEMORIES
POST MORTEM MEMORIES (WEAPON SYSTEMS)
ARTIFICIAL MEMORY SYSTEMS
NON-INTELLIGENT MICRO CONTROLLERS
FIRST-IN NEVER-OUT (FINO) ASYNCHRONOUS BUFFERS
OVERFLOW REGISTER (BIT BUCKET)

PROCESS TECHNOLOGY

The use of Signetics unique SEX(7) process yields Vth (var.) and allows the design(8) and production(9) of higher performance MOS circuits than can be obtained by competitor's techniques.

BIPOLAR COMPATIBILITY

All data and clock inputs plus applicable outputs will interface directly or nearly directly with bipolar circuits of suitable characteristics. In any event use 1 amp fuses in all power supply and data lines.

INPUT PROTECTION

All terminals are provided with slip-on latex protectors for the prevention of Voltage Destruction. (PILL packaged devices do not require protection).

SILICON PACKAGING

Low cost silicon DIP packaging is implemented and reliability is assured by the use of a non-hermetic sealing technique which prevents the entrapment of harmful ions, but which allows the free exchange of friendly ions.

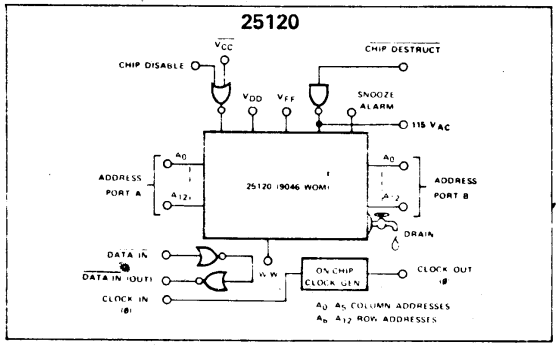
SPECIAL FEATURES

Because of the employment of the Signetics' proprietary Sanderson-Rabbet Channel the 25120 will provide 50% higher speed than you will obtain.

COOLING

The 25120 is easily cooled by employment of a six-foot fan, 1/2" from the package. If the device fails, you have exceeded the ratings. In such cases, more air is recommended.

BLOCK DIAGRAM



PART IDENTIFICATION

TYPE	"n"	TEMP. RANGE	PACKAGE
25120	0	0 to -70°C	Whatever's Right

1. "Neu" channel devices enhance or deplete regardless of gate polarity, either simultaneously or randomly. Sometimes not at all.
2. "S.O.S." copyrighted U.S. Army Commissary, 1940.
3. Not applicable
4. You can somehow drive these inputs from TTL, the method is obvious.
5. Measure at 1 MHz, 25mVac, 1.9pF in series.
6. For the filaments, what else!
7. You have a dirty mind. S.E.X. is Signetics EXtra Secret process. "One Shovel Full to One Shovel Full", patented by Yagura, Kashkooli, Converse and Al. Circa 1921.
8. J. Kane calls it design (we humor him).
9. See "Modern Production Techniques" by T. Arrieta (not yet written).
10. Final until we got a look at some actual parts.
11. Coffee breaks and lunch hours.
12. Due credit to ElMAC for inspiration.

(APRIL FOOL)

8008 ASSEMBLY LANGUAGE REFERENCE CARD

THIS IS A POCKET SIZE CARD CONTAINING THE 8008 INSTRUCTION SET ORGANIZED IN EASY TO USE FASHION WITH HEX CODE EQUIVALENTS & A HEX-ASCII TABLE. ITS ORIENTED TOWARDS THE INTEL 8008 FORTRAN CROSS ASSEMBLER BUT WOULD BE VERY HANDY TO HAVE. ORDER MCS-129-0674-10K. THEY PROBABLY HAVE AN 8080 VERSION ALSO.

MARK-8 USER GROUP SURVEY

JOE CIMMINO SAYS HE HAS RECEIVED ABOUT 55% OF THE USER SURVEYS BACK SO FAR. THAT MEANS THAT 45% OF YOU HAVE IT SITTING ON YOUR "I'VE GOT TO DO THIS SOME DAY" PILE. PLEASE FILL OUT WHATEVER IS APPLICABLE AND GET IT MAILED BACK. JOE WENT TO A LOT OF WORK AND EXPENSE TO MAIL THESE AND IT WOULD BE AWFUL IF WE DIDN'T GET WORTHWHILE INFORMATION BACK. DO IT NOW!!

JOE HAS ASKED FOR ABOUT 15 PAGES IN NL#7 FOR REPORTING RESULTS OF THE SURVEY AND HIS ANNOUNCEMENT ABOUT A SOFTWARE LIBRARY SERVICE. HE WILL ALSO INCLUDE A SAMPLE PROGRAM, AND DEMONSTRATE WHAT PROPER DOCUMENTATION IS ALL ABOUT.

COMPUTER ALTERNATIVES INDEX (COMINDEX)

COMPUTER ALTERNATIVES SEEMS TO BE THE LATEST BUZZ WORD. NO ONE HAS REALLY TOLD ME WHAT IT MEANS BUT I'VE GOT SOME VAGUE IDEAS. BOB WALLACE, PO BOX 5415, SEATTLE, WA 98105 PUBLISHES "COMINDEX", A DIRECTORY OF GROUPS AND PEOPLE INTERESTED IN THE USE OF COMPUTERS AS A COMMUNITY COMMUNICATIONS TOOL, AND A LIST OF PAPERS, ARTICLES, AND OTHER INFORMATION AVAILABLE FOR COPYING COSTS. THE "COMINDEX" WILL ALSO TRY TO INCLUDE OTHER AREAS OF ALTERNATIVE COMPUTER USE SUCH AS ACCESS TO HARDWARE, SIMULATION OF SYSTEMS, CREATIVITY IN GRAPHICS AND GAMES, AND SOCIAL/POLITICAL RESEARCH. SUBSCRIPTION TO "COMINDEX" IS $2.00 FOR ONE FULL DIRECTORY AND THREE UPDATES. WRITE AND INCLUDE A SASE FOR ADDITONAL INFORMATION.

RESOURCE ONE NEWSLETTER

YOU MAY BE INTERESTED IN THE RESOURCE ONE NEWSLETTER, 1380 HOWARD ST., SAN FRANCISCO, CA 94103. THIS GROUP OBTAINED A SURPLUS XDS-940 TIME SHARE COMPUTER AND IS NOW DEVOTED TO THE FOLLOWING PROBLEMS:
CAN THIS TOOL OF MILITARIZED SOCIETY BE MADE DIRECTLY USEFUL TO PEOPLE? HOW? THEY ARE DEPENDENT LARGELY ON FOUNDATIONS FOR THEIR SUPPORT BUT ARE ALSO SOLICITING TAX DEDUCTIBLE DONATIONS. WRITE AND INCLUDE AN SASE FOR INFORMATION.

DIGITAL GROUP ACTIVITIES

THE DIGITAL GROUP, PO BOX 6528, DENVER, CO 80206 IS THE BEST EXAMPLE OF WHAT HAPPENS WHEN A GROUP OF INTERESTED & CLEVER GUYS GET TOGETHER AND SHARE LABOR AND RESOURCES. THEY ARE DELIVERING ON THEIR $8 DOCUMENTATION PACKAGE AND COMMENTS COMING IN INDICATE UNANIMOUS ACCLAIM. THE SOFTWARE DOCUMENTATION AND CASSETTE TAPE 2K MONITOR SYSTEM HAVE BEEN SENT OUT. THE ELECTRONIC DOCUMENTATION PACKAGE HAS BEEN OR SOON WILL BE MAILED OUT. DR. SUDING INSISTED THAT A COPY OF HIS SCIENTIFIC CALCULATOR INTERFACE BE INCLUDED. (THIS IS NEAT! MINI MICRO MART IS SUPPOSE TO HAVE A COMPLETE PACKAGE CONTAINING PC BOARD AND PARTS AVAILABLE SOON FOR $69.95. WITH 256 WORDS OF MEMORY AND A SUDING TVT, A PROGRAM IS AVAILABLE THAT SIMULATES AN SR-50 CALCULATOR USING A MARK-8. THIS SHOULD SOLVE PROBLEMS FOR PEOPLE LOOKING FOR A FLOATING POINT PACKAGE IF THEY CAN LIVE WITH THE CALCULATION SPEED.)

EVERYONE HAS PROBABLY SEEN THE DIGITAL GROUP'S LETTER TO THE EDITOR IN THE APRIL R-E. THAT WAS WRITTEN IN AUGUST 74 SO YOU CAN GET A ROUGH IDEA OF NON-ADVERTISING LEAD TIMES IN NATIONAL MAGAZINES. THE FOLLOWING IS AN EXCERPT FROM THEIR LATEST LETTER DATED 21 MARCH:

PROJECT UPDATE - Digital Group, PO Box 6528, Denver, CO 80206

The digital group is literally exploding, thanks to your support, and now has 4 major efforts going ahead full out.

1. Top priority - support of Dr. Suding's efforts at as high a quality level as possible.

2. We now have about 100 requests and SASE's for the digital group clearinghouse. We are debating on various alternatives and options to complement rather than supplant other efforts such as the Micro-8 Newsletter. (Please remember, that letter was sent to R/E in August, 1974.) Naturally, you will be kept informed of any and all developments and we certainly invite your comments!

3. PC Boards - as you probably guessed, we ran into a non-performance problem with the TVT board from one of our former participants. That problem has been rectified totally by a new individual who is a PC Development professional. His work is both fast and good. He is also very eager to get other boards going.

4. Parts and Kits - We had no desire to become another parts house. However, the mail started coming in and people keep asking for kits, parts, availability and etc. (Lots of Doctors.) And then in walked the manager of a parts house that has been in business for 15 years and who is very eager to contribute to the Microprocessor experimenter effort. (He's also now building a Suding-8.) His prices are reasonable, if not outstanding (ex - 1101's for $1.40), and he is willing to supply kits of new, guaranteed parts for about anything we can come up with. Therefore, we will be offering most developments in the following modes:
   a. Major chip(s)
   b. PC Board
   c. Major chip(s) and PC Board
   d. Complete parts kit
   e. Assembled and tested units

   We are offering full parts kits and assembled units primarily as a convenience for those who desire it. We expect to remain very competitive and offer substantial value but are not trying to do an MITS (we REALLY don't want to become an MITS _ maybe we can goad them into being a little more honest and reasonably priced on peripherals.)

STATUS OF PROJECTS

TVT - Board now in final design stage. Character generator chips will be available at a discount in 2 weeks with luck, 4 weeks without.

Cassette Interface - Board being produced by company in Colorado Springs - available soon - method and price yet to be determined.

Scientific Calculator Interface - Chip, board, and kit should be available very soon through Mini-Micro Mart (if Maury can deliver - MOS Technology has 8 week lead times and no quantity break until 5000 units!) The digital group will serve as backup and will supply software (lots happening here!). You won't believe how powerful this combination is!

Dr. Suding's highest priority design project right now is 4K dynamic RAMs. As fast as he perfects the design, we will do a board and make kits available. Should be in the 1 to 2 month time-frame. With any luck, 4K's should drop in price again (now $12 in 100s) and be even more cost-effective.

BASIC - We will be adapting a subset of BASIC to the Scientific calculator interface as soon as possible but it looks like we'll need the 4Ks.

8800 support and adaptations are being implemented but so far on a relatively low-priority level.

JAMES G. CALLAS, M. D.
EVELYN R. CALLAS, M. D.
631 NORTH SAN PEDRO ROAD
SAN RAFAEL, CALIF. 94903

Adam Trent's hint in the vol. 1 #4 NL about using Augat pins for ic's on the memory board works very well except that many ordinary diagonal cutters will not grip the pin head well enough to pull it out.

A finer pair of cutters, the Hunter A92MS (available from National Camera, Englewood, Colo. as catalog #N-3224) work much better in removing the Augat pins. They are also far superior to ordinary cutters for fine work around PC boards.

One of the least expensive, as well as most efficient, ways of checking fine soldering is to look with an 8X magnifier mounted in a plastic barrel, that's sold by photo shops for about $4. Hold the lens upside down, so as to focus close enough and light the PC board both in front and back.

Another handy hint: an audible continuity tester, as simple as a battery and buzzer in series, is a great convenience in testing for solder bridges.

LOCAL GROUPS

PART OF THE FUNCTION OF THE USER GROUP IS GETTING PEOPLE TOGETHER. YOU SHOULD HAVE A PRETTY GOOD IDEA WHETHER ANY PARTICIPANTS ARE NEAR YOU BY NOW. THE UPDATED ROSTER HAS BEEN POSTPONED AGAIN TILL NEXT ISSUE.

EVERYONE HAS HEARD OF THE DENVER BASED DIGITAL GROUP. THEY ARE A PRIME EXAMPLE OF WHAT CAN BE DONE WHEN A BUNCH OF GUYS GET TOGETHER AND SHARE RESOURCES.

WE WERE EVEN ABLE TO GET TOGETHER A GROUP IN SLEEPY OLD LOMPOC! OUR FIRST MEETING WAS HELD MARCH 19 AT THE CABRILLO COMPUTER CENTER AND WAS ATTENDED BY 4 PEOPLE FROM SANTA BARBARA, 1 FROM PASO ROBLES, AND 13 PEOPLE FROM THE LOMPOC-SANTA MARIA-VANDENBERG AIR FORCE BASE AREA. OUR NEXT MEETING IS SCHEDULED FOR APRIL 16, 7:30 PM IN THE CABRILLO COMPUTER CENTER. MR. BOYCE SHOWED OFF HIS NEARLY COMPLETED ALTAIR 8800. MY PARTIALLY COMPLETED 8008 SYSTEMS WERE ON DISPLAY. (I MAY BE THE VERY LAST ONE TO GET A MARK-8 RUNNING.), THE HOMEMADE PAPER TAPE READER WAS DEMONSTRATED AND OUR PDP-8 WAS LOADED WITH A 4K BASIC SO PEOPLE COULD SEE HOW MUCH FUN A 6K BASIC FOR AN 8008/8080 WOULD BE.

OUT LATEST INFO ON LOCAL GROUPS IS AS FOLLOWS. CONTACT:

DENVER AREA - DIGITAL GROUP, PO BOX 6528, DENVER, CO 80206

WASHINGTON DC AREA - JOE CIMMINO, 19304 RICHWOOD COURT, BROOKEVILLE, MD 20729

CHICAGO AREA - ROBERT SWARTZ, 195 IVY LANE, HIGHLAND PARK, IL 60035 472-6660 DAYS AND 432-6423 EVENINGS

BAY AREA - FRED MOORE, 2100 SANTA CRUZ AVE., MENLO PARK, CA 94025

SANTA BARBARA, SANTA MARIA, LOMPOC, VANDENBERG AFB AREA - TED SALLUME, 945 VIA FARGO, SANTA MARIA, CA 805-WE7-4541 OR 805-865-3236 OR THE CABRILLO COMPUTER CENTER OR HAL SINGER, 805-735-1596

LA AREA - DE WALTER EKSTRAND, PO BOX 1260D, SOUTH GATE, CA 90280 (HE WANTS TO START AN LA GROUP)

PLEASE KEEP US UP TO DATE ON LOCAL GROUP ORGANIZATIONS AND WHAT IS HAPPENING. IT WOULD BE IDEAL IF ONE MEMBER FROM EACH GROUP PREPARED A CAMERA READY PROGRESS REPORT FOR EACH NEWSLETTER.

FRED MOORE, 2100 SANTA CRUZ AVE., MENLO PARK, CA 94025 IS EDITOR OF THE BAY AREA AMATEUR COMPUTER USERS GROUP. THEY HAVE ALREADY HAD THEIR 2ND MEETING AND MAYBE THEIR THIRD BY THE TIME YOU RECEIVE THIS. THE 2ND MEETING WAS ATTENDED BY ABOUT 45 PEOPLE. THE FIRST PAGE OF THEIR FIRST NEWSLETTER IS REPRINTED HERE.

NEWSLETTER

Issue number one Fred Moore, editor, 2100 Santa Cruz Ave., Menlo Park, Ca. 94025 March 15, 1975

AMATEUR COMPUTER USERS GROUP
HOMEBREW COMPUTER CLUB . . . you name it.

Are you building your own computer? Terminal? T V Typewriter? I/O device? or some other digital black-magic box?

Or are you buying time on a time sharing service?

If so, you might like to come to a gathering of people with likeminded interests. Exchange information, swap ideas, talk shop, help work on a project, whatever . .

This simple announcement brought 32 enthusiastic people together March 5th at Gordon's garage. We arrived from all over the Bay Area---Berkeley to Los Gatos. After a quick round of introductions, the questions, comments, reports, info on supply sources, etc., poured forth in a spontaneous spirit of sharing. Six in the group already had homebrew systems up and running. Some were designing theirs around the 8008 microprocessor chip; several had sent for the Altair 8800 kit. The group contained a good cross section of both hardware experts and software programmers.

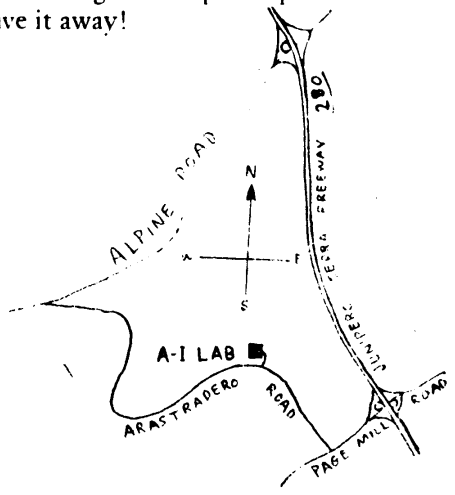
We got into a short dispute over HEX or Octal until someone mentioned that if you are setting the switches by hand it doesn't make any difference. Talked about other standards: re-start locations? input ports? better operating code for the 8080? paper tape or cassettes or paper & pencil listings? Even ASCII should not be assumed the standard: many 5 channel Model 15 TTYs are about and in use by RTTY folks. Home computing is a hobby for the experimenter and explorer of what can be done cheaply. I doubt that standards will ever be completely agreed on because of the trade-offs in design and because what's available for one amateur may not be obtainable for another.

Talked about what we want to do as a club: quantity buying, cooperation on software, need to develop a cross assembler, share experience in hardware design, classes possibly, tips on what's currently available where, etc. Marty passed out M.I.'s Application Manual on the MF8008 and let it be known that he could get anything we want. Steve gave a report on his recent visit to MITS. About 1500 Altairs have been shipped out so far. MITS expects to send out 1100 more this month. No interfaces or peripherals are available until they catch up with the mainframe back orders. Bob passed out the latest PCC and showed the Altair 8800 which had arrived that week (the red LEDs blink and flash nicely). Ken unboxed and demonstrated the impressive Phi-Deck tape transport.

What will people do with a computer in their home? Well, we asked that question and the variety of responses show that the imagination of people has been underestimated. Uses ranged from the private secretary functions: text editing, mass storage, memory, etc., to control of house utilities: heating, alarms, sprinkler system, auto tune-up, cooking, etc., to GAMES: all kinds, TV graphics, x - y plotting, making music, small robots and turtles, and other educational uses, to small business applications and neighborhood memory networks. I expect home computers will be used in unconventional ways---most of which no one has thought of yet.

We decided to start a newsletter and meet again in two weeks. As the meeting broke up into private conversations, Marty held up an 8008 chip, asked who could use it, and gave it away!

NEXT MEETING WEDNESDAY, MARCH 19th, 7 PM at Stanford's Artificial Intellegence Laboratory, Conference room, Arastradero Road in Portola Valley. Look for this road sign: D C Power Lab



Announcement

Texas Instruments Learning Center is presenting an early morning home television series, April 15 - 18, on "Introduction to Microprocessors." In the San Jose - Bay Area this program will be on channel 11 at 6:00 AM.

HOW MUCH POWER SUPPLY?

BY STEVE CIARCIA
41 HILLTOP DRIVE
WEST HARTFORD, CT 06107

DESIGNING POWER SUPPLIES IS NO EASY BUSINESS. THE NEW SERIES OF THREE TERMINAL REGULATORS BEING SOLD HAVE LED THE HOBBYIST INTO A FALSE SENSE OF SECURITY. SINCE THESE CHIPS PROVIDE SUPPOSEDLY FAIL-SAFE OPERATION AND HAVE THEIR OWN THERMAL OVERLOAD SHUTDOWN ABILITY, MANY FORGET THAT THIS USUALLY DOES NOT EXTEND TO THE OTHER EXTERNAL COMPONENTS.

IN GENERAL, IF THE HOBBYIST HAS ONLY A SLIGHT KNOWLEDGE OF SUCH THINGS AS CAPACITOR RIPPLE CURRENT RATINGS, DIODE SURGE CURRENTS, TRANFORMER SOURCE RESISTANCES, THE DERATING EFFECTS OF ELEVATED TEMPERATURES, AND OVERVOLTAGE PROTECTION, HE SHOULD CONSIDER PURCHASING A COMMERERCIAL POWER SUPPLY RATHER THAN DEVELOPING ONE. THE PROBLEM WITH THIS IDEA IS, OF COURSE, THE COST OF HIGH CURRENT SUPPLIES. $175 WOULD BE CONSIDERED MODEST AND COULD AMOUNT TO CONSIDERABLY MORE DEPENDING ON THE CONFIGURATION AND REQUIREMENTS. THIS LEAVES ANOTHER ALTERNATIVE. THERE ARE TWO WAYS TO LEARN THINGS IN LIFE: THROUGH TRIAL AND ERROR OR SOMEONE TELLS YOU. TRIAL AND ERROR CAN BECOME VERY EXPENSIVE IF ONE WIPES OUT 100 OR SO CHIPS IN A COMPUTER WHILE TRYING TO DESIGN A POWER SUPPLY. THIS NEWSLETTER IS DEDICATED TO THE IDEA THAT THERE HAS TO BE A BETTER WAY THAN THAT.

THIS IS NOT AN ENGINEERING DISSERTATION WITH ALL THE FUNNY LOOKING MATH THAT ALL OF US HAVE FORGOTTEN ANYWAY. IT WILL ATTEMPT TO ENLIGHTEN AND EDUCATE THE CURIOUS, PROVIDE DESIGN CONFIGURATIONS TO THE DEDICATED, AND PROBABLY BORE TO DEATH ANYONE WHO REALLY KNOWS HIS STUFF. OUR ATTENTION WILL BE FOCUSED ON REQUIREMENTS FOR SYSTEMS SUCH AS THE MARK-8 AND THE SCELBI-8H. BOTH OF THESE COMPUTERS ARE SOLD WITHOUT POWER SUPPLIES AND IT IS LEFT TO THE INVENTIVENESS OF ITS OWNER AS TO THE TYPE OF "KLUGE" HE PUTS TOGETHER IN AN EFFORT TO GET "ON LINE". IT IS USUALLY AT THIS PPOINT THE TERM "SMOKE TEST" IS APPLICABLE BUT IT IS HOPED THAT THIS FATE CAN BE SUCESSFULLY AVOIDED.

FIRST OF ALL, HOW MUCH POWER SUPPLY DOES ONE ACTUALLY NEED TO POWER A TYPICAL MARK-8? SHOULD ONE USE A SINGLE LARGE MASTER SUPPLY AND RUN POWER LINES TO THE CPU AND ALL PERIPHERALS OR WOULD INDIVIDUAL SUPPLIES BE PREFERABLE? IS A 25 AMP SUPPLY BETTER THAN A 5 AMP? WHAT IS AN OVERVOLTAGE CROWBAR AND AT WHAT VOLTAGE SHOULD IT TRIGGER?

ENOUGH QUESTIONS FOR THE MOMENT. IT IS A SURE BET THERE WILL BE MANY MORE. IT HAS TO BE ASSUMED FROM THE START THAT THIS DISCUSSION IS DEDICATED TO FINDING A CHEAP SOLUTION AS WELL AS AN ADEQUATE DESIGN. THOUGH IT WAS INITIALLY INTIMATED THAT 3 TERMINAL REGULATORS MAY NOT NECESSARILY BE "GOD'S GIFT TO THE COMPUTER HOBBYIST" THEY ARE CHEAP, WORK WELL WHEN PROPERLY APPLIED, & CUT DOWN COMPONENT COUNT CONSIDERABLY.

MOST PEOPLE WOULD PREFER TO DO AS LITTLE CONSTRUCTION WORK AS POSSIBLE SO THAT IS THE TYPE OF POWER SUPPLY DESIGN WE WILL INVESTIGATE. THE TYPICAL POWER SUPPLY REQUIREMENTS FOR THESE MINICOMPUTERS WITH 1K OF 1101 RAM'S IS +5 VOLTS AT 3 AMPS AND -9 VOLTS AT 1 AMPS. FOR EACH ADDITIONAL 1K OF 1101'S IT TAKES ABOUT 1 AMP OF +5 VOLTS AND 1 AMP OF -9 VOLTS. THIS WOULD MEAN THAT A 4K/1101 SYSTEM WOULD REQUIRE A TOTAL OF +5 VOLTS AT 6 AMPS AND -9 VOLTS AT 4 AMPS. A COMPARABLE SYSTEM WHICH USES 2102 RAMS WOULD REQUIRE +5 VOLTS AT 3 AMPS AND -9 VOLTS AT 50 MA. FOR A 1K SYSTEM. A 4K/2102 SYSTEM WOULD HAVE +5 AT 6 AMPS BUT NO MORE -9 VOLT REQUIREMENT. HEAVEN FORBID THAT ANYONE GETS TO 16K OF 2102'S (THAT TAKES A LOT OF BREAD!) BECAUSE IT WOULD NEED ABOUT 15 TO 18 AMPS OF +5 VOLT POWER. DON'T LET THESE FIGURES SCARE YOU BECAUSE IN THE REAL WORLD OF COMPUTERS THESE ARE VERY SMALL POWER SUPPLIES. THE CONTROL DATA SYSTEM 17, WHICH IS A 32K/16 BIT MINI, HAS A +5 VOLT 42 AMP SUPPLY.

WHAT ALL THIS BOILS DOWN TO IS THAT YOU STILL DON'T KNOW HOW BIG A SUPPLY TO BUILD. DON'T FORGET THE PERIPHERALS. ARE THEY GOING TO BE POWERED BY THE SAME POWER SUPPLY AS THE COMPUTER? IF SOMETHING LIKE THE TVT OR A SIMILAR CRT IS USED IT REQUIRES +5 VOLTS AT 1/2 TO 1 AMP AND -12 AND -5 VOLTS AT AROUND 25 MA. A CASSETTE INTERFACE, DEPENDING WHETHER IT USES UART OR STRAIGHT TTL CAN USE +5 AT 100 MA. AND -12 AT 50 MA. PROM'S ARE COMPARABLE TO 1101'S.

OBVIOUSLY THE COMPUTER IS THE MAIN CONSIDERATION. IT HAS TO BE DECIDED BEFORE ONE LAYS OUT THE CASH JUST HOW BIG A SUPPLY IS EVENTUALLY GOING TO BE NEEDED WHEN ALL THAT GARBAGE YOU NEVER THOUGHT YOU'D GET IS SUDDENLY THERE. IN GENERAL, I WOULD ASSUME THAT NOT TOO MANY PEOPLE WILL HAVE MORE THAN A 4K SYSTEM AND MOST WILL SUFFICE WITH 1K OR 2K. THERE OF COURSE WILL BE AN OCCASIONAL 8K AS I PLAN. LOGICALLY, THOSE WHO PLAN 4K SHOULD PROVIDE 6 AMPS AT 5 VOLTS AS A MINIMUM. IN THESE CURRENT RANGES THERE ARE MINIMAL DIFFERENCES BETWEEN SUPPLIES OF 4, 6, AND 8 A AMPS. THEY ALL GENERALLY USE THE SAME REGULATOR AND JUST CHANGE THE INPUT FILTERING AND HEAT SINK COOLING AS NECESSARY.

SINCE ECONOMY, VERSATILITY, AND EFFECTIVITY ARE THE MAIN CONSIDERATIONS, THE FOLLOWING SUPPLY CONFIGURATION WOULD MORE THAN ADEQUATELY SUFFICE:

THE SUPPLY SHOULD BE A VARIABLE VOLTAGE (5 TO 15) FLOATING OUTPUT DESIGN. THE REGULATOR SECTION SHOULD BE CAPABLE OF 5 AMPS IN FREE AIR AND 10 TO 12 AMPS WITH FORCED AIR COOLING. SINCE THE OUTPUT IS FLOATING, ALL SUPPLIES (+5, -9, ETC) WOULD HAVE EXACTLY THE SAME REGULATOR BUT WITH THE OUTPUT VOLTAGE AND INPUT FILTER ADJUSTED ACCORDINGLY. A BLOCK DIAGRAM FOR A +5 AND -9 VOLT SUPPLY WOULD BE AS ILLUSTRATEED IN FIGURE 1.

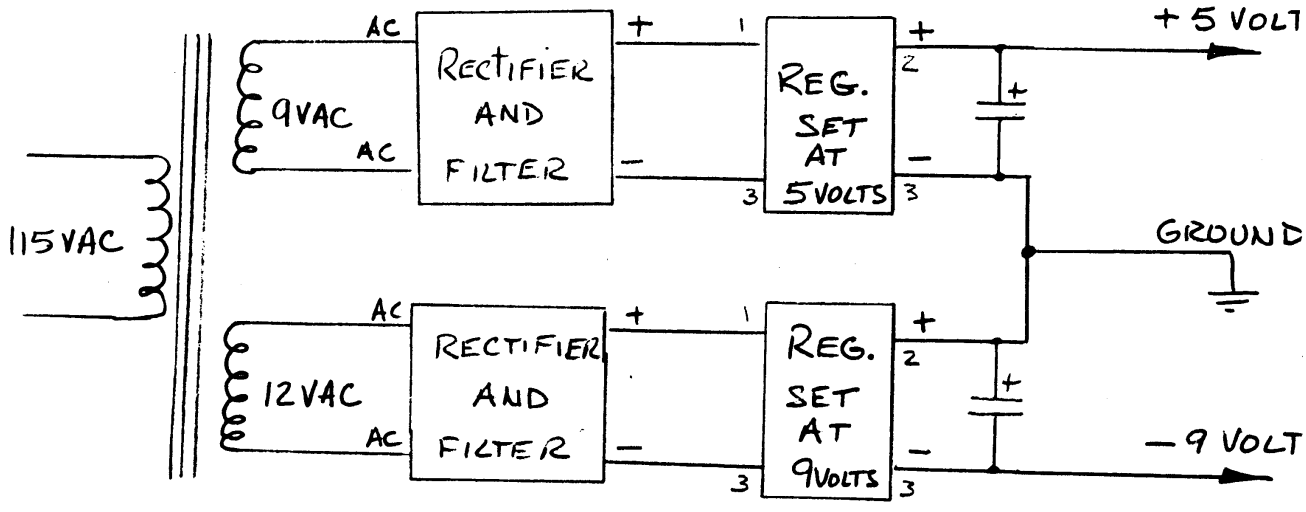


FIGURE 1 POWER SUPPLY BLOCK DIAGRAM

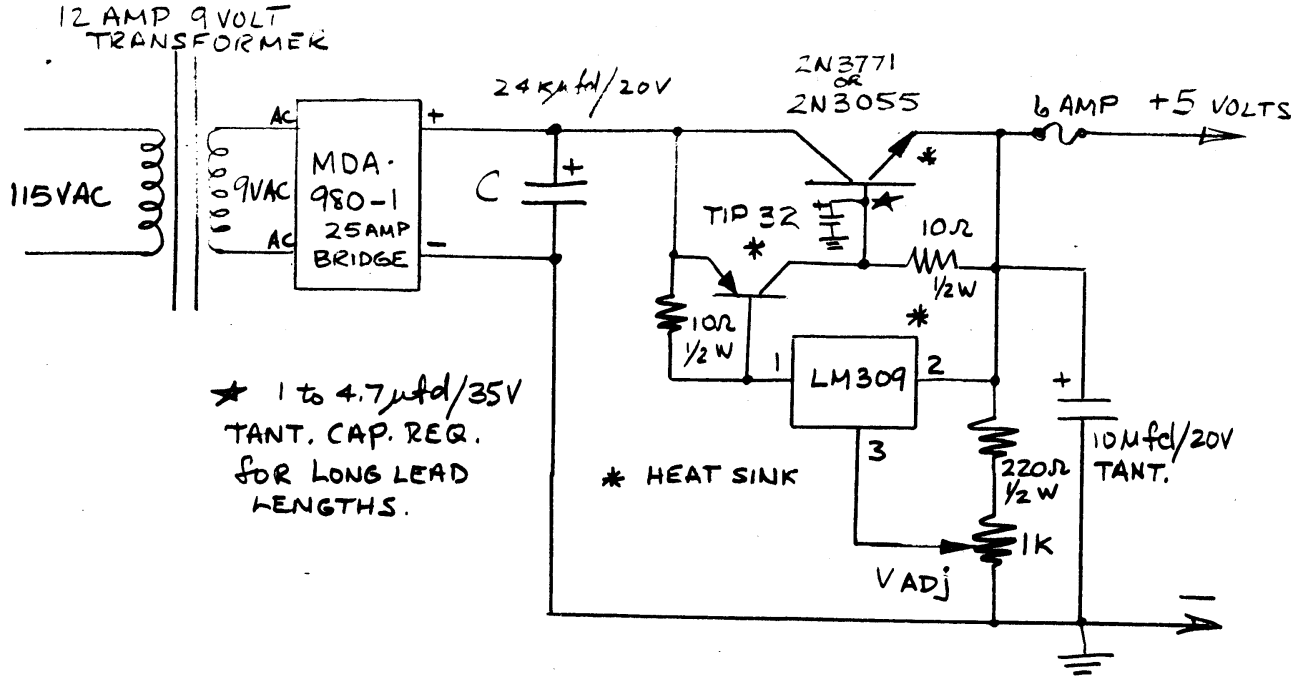
SINCE BOTH REGULATORS ARE THE SAME THERE IS LESS TESTING INVOLVED, FEWER PART TYPES TO ORDER, AND IT ALLOWS THE COMPUTER CONFIGURATION TO BE CHANGED IN MIDSTREAM, SAY FROM 1101'S TO 2102'S. THE FORMER LARGE -9 VOLT SUPPLY COULD BE REVERSED AND SET AT +5 VOLTS AND USED TO POWER A LARGE SECTION OF MEMORY FOR INSTANCE.

THE FOLLOWING IS THE DETAILED SCHEMATIC OF ONE OF THESE BUILDING BLOCK TYPE SUPPLIES WHICH USES READILY AVAILABLE PARTS AND IS FAIRLY INEXPENSIVE. SEE FIGURE 2.

IT IS NOT MY INTENTION TO PUT A SCHEMATIC AND PARTS LIST BEFORE THE READER AND SUGGEST THAT ONLY THE COMPONENTS I HAVE CHOSEN WILL WORK. THIS CIRCUIT IS VERY DEPENDABLE AND OPERATES QUITE SUCCESSFULLY WITH THE COMPONENTS INDICATED. BUT, IN ORDER TO SATISFY THE DEDICATED READERS, I'D LIKE TO OUTLINE SOME "SEAT OF THE PANTS" METHODS FOR COMPONENT SELECTION.

FEW PEOPLE REALIZE HOW TO CHOOSE THE CORRECT VALUE OF INPUT FILTER CAPACITORS AND GENERALLY "LUCKOUT" BY CHOOSING THE LARGEST ONE THEY CAN FIND. THIS WILL USUALLY PROVIDE MORE THAN ADEQUATE RIPPLE FILTERING BUT CAN LEAD TO BRDIGE RECTIFIER BREAKDOWN BECAUSE OF THE TREMENDOUS SURGE CURRENTS REQUIRED TO CHARGE THIS BARGAIN BASEMENT SPECIAL. SUDDEN APPLICATIONS OF RAW AC TO ELECTROLYTIC FILTER CAPS WHEN THE RECTIFIER BREAKS DOWN CAN LEAD TO AN IMMEDIATE UNDERSTANDING OF THE TERM "SMOKE TEST". WHEN DESIGNING POWER SUPPLIES, IT IS BEST TO WORK FROM THE OUTPUT BACK, TAKING INTO CONSIDERATION THE WORST CASE OPERATING MODE OF EACH COMPONENT. NEGLECTING THE ESSOTERIC MATHEMATICS OF A COMPLETE DESIGN SPECIFICATION, AND REALIZING THE ROOM TEMPERATURE

FIGURE 2 VARIABLE VOLTAGE HIGH CURRENT POWER SUPPLY



OPERATING MODE OF HOBBY ELECTRONICS, MUCH CAN BE ASSUMED AND ELIMINATED. A TYPICAL DESIGN PROGRESSION SHOULD BE:

CHOOSE AN OUTPUT VOLTAGE AND CURRENT. A GOOD SUGGESTIONS WOULD BE 5 VOLTS AT 6 AMPS USING THE REGULATOR TYPE PREVIOUSLY DESCRIBED. A THREE TERMINAL REGULATOR SUCH AS THE LM309 REQUIRES APPROXIMATELY A 3 VOLT HIGHER INPUT THAN OUTPUT. THAT IS, FOR A 5 VOLT REGULATED OUTPUT, THE REGULATOR MUST HAVE A WORST CASE MINIMUM OF 8 VOLTS OF RIPPLE FREE DC ON THE INPUT TO OPERATE RELIABLY. IF THE REGULATOR WERE SET AT 15 VOLTS OUT, THE MINIMUM INPUT SHOULD BE 18 VOLTS. THE EXTERNAL COMPONENTS ATTACHED TO THE LM309 ARE CURRENT AMPLIFIERS (THE 309 IS A ONE AMP DEVICE) AND THE ENTIRE REGULATOR SECTION CAN BE TREATED AS A SINGLE COMPONENT WITH ADJUSTABLE VOLTAGE SELECTION (FIGURE 3).

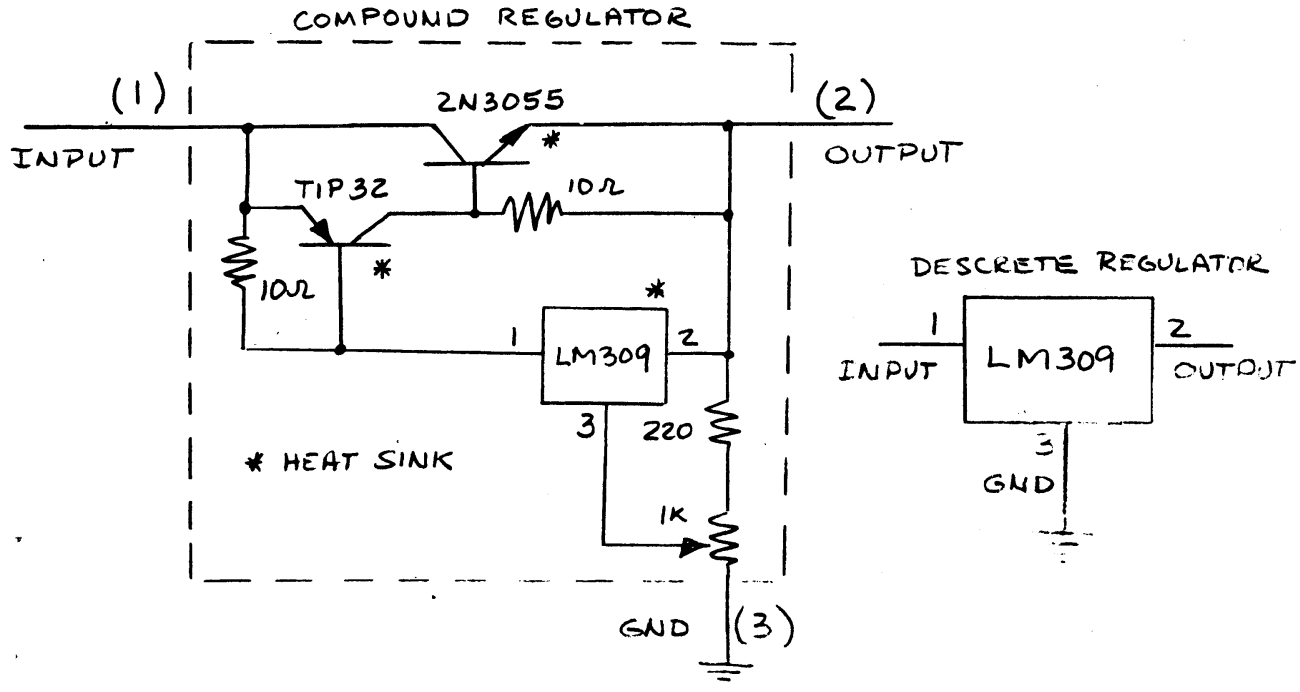


FIGURE 3. REGULATOR WIRING SIMILARITY

POWER DISSIPATION IS STILL A FACTOR TO BE RECONNED WITH AS MUCH OF THE SINGLE REGULATOR WOULD BE. POWER DISSIPATION (IN WATTS OF HEAT BUILT UP IN THE REGULATOR) IS DEFINED AS THE OUTPUT VOLTAGE MINUUS INPUT VOLTAGE TIMES THE CURRENT PASSING THROUGH IT. IN THE 5 VOLT UNIT, THE INPUT IS 10 VOLTS AND THE OUTPUT IS 5 VOLTS, AND ONE IS DRAWING 5 AMPS, THIS IS A MORE THAN MODEST 25 WATTS. THE MAXIMUM RATING OF A 2N3055 IS 15 AMPS WITH 115 WATTS OF POWER. LOOSELY SPEAKING, THIS WOULD MEAN THAT A 5 AMP 5 VOLT SUPPLY COULD HAVE NO HIGHER THAN A V(IN) OF 23 VOLTS. THE CLINCHER IS THAT THE HEAT MUST BE CONTINUALLY REMOVED FROM THE REGULATOR WITH HEAT SINKS, FANS, OR A COMBINATION OF THEM. HEAT SINKS WHICH ARE COMMERCIALLY SOLD AND FOR EXAMPLE RATED AT 20 WATTS USUALLY MEAN THAT THE UNIT WILL COOL (BE CAREFUL OF THIS WORD!). A DEVICE WHICH HAS A CONTINUOUS POWER DISSIPATION OF 20 WATTS AND HOLD THE TEMPERATURE BUILD UP TO NO HIGHER THAN A MODEST 150-200 DEGREES F. (RIGHT ON!). IF YOU WANT ONE THAT WILL TAKE THAT 20 WATTS AND STAY ABOUT 120 DEGREES F (REASONABLE), IT SHOULD HAVE A COMMERCIAL RATING AROUND 60 TO 100 WATTS WHICH IS A LITTLE MORE EXPENSIVE. NOW COMES THE SEAT OF THE PANTS ENGINEERING FOR THE HOBBYIST. IF YOU CALCULATE THAT THE POWER DISSIPATION IS ABOVE 25 WATTS, FORGET ALL THE COMPUTATIONS AND GO BUY A MUFFIN FAN. IT WILL COOL YOUR POWER SUPPLY AND KEEP ALL THOSE TEMPERATURE FALLOUT REJECTS WHICH YOU BOUGHT FROM THE MAIL ORDER HOUSE IN SPEC. WITH A GOOD FAN, A 25 WATT RATED HEATSINK CAN GO 100 WATTS EASILY (DON'T EVER EXCEED THE TRANSISTOR POWER RATING. IT IS DEPENDENT ON SOME THINGS NOT COVERED BY THIS SEAT OF THE PANTS METHOD) AND STAY AT A VERY REASONABLE TEMPERATURE.

UP TO THIS POINT WE HAVE CONCERNED OURSELVES MAINLY WITH THE REGULATOR AND IT'S MINIMUM INPUT REQUIREMENTS. THE TRANFORMER, RECTIFIER, AND FILTER SECTION HAS TO BE DESIGNED TO PROVIDE THE DESIRED INPUT IF THE SUPPLY IS TO WORK. PREVIOUSLY IT WAS MENTIONED THAT AN 8 VOLT NO RIPPLE INPUT IS NEEDED FOR A FIVE VOLT SYSTEM AND 18 VOLTS FOR A 15 VOLT UNIT. OBVIOUSLY THE TRANSFORMER CHOSEN HAS TO BE CAPABLE OF SUPPLYING THE DESIRED VOLTAGE AND CURRENT CAPACITY FOR THE APPLICATION. A THREE AMP SUPPLY CANNOT BE MADE USING A ONE AMP TRANSFORMER. BY THE SAME TOKEN, BE CAREFUL OF USING A TRANFORMER AT IT'S FULL RATED CURRENT BECAUSE IT WILL GET HOT. IT IS MY EXPERIENCE THAT SOME UNITS LIKE THE RADIO SHACK 1.2 AMP SERIES ARE GOOD FOR ABOUT 3/4 AMP CONTINUOUS BUT GOOD GOOD LUCK TO YOU AT 1.2 AMPS. BUY THE BEST TRANSFORMER IN YOUR PRICE RANGE THAT WILL DO THE JOB; YOU WON'T BE SORRY. A GOOD MARGIN IS ABOUT 20% RESERVE CAPACITY. THE TRANSFORMER IS NOT SUPPLYING A CONTINUOUS STEADY CURRENT TO THE FILTER BUT RATHER SHORT BURSTS WHICH CAN BE MUCH HIGHER THAT THE AVERAGE RATING AS QUOTED. THE RECTIFIER SHOULD NOT BE NEGLECTED BECAUSE IT HAS TO BE ABLE TO HANDLE THESE SURGE CURRENTS. THE WORST CASE WHICH A DIODE EXPERIENCES IS ON INITIAL TURN ON WHERE IT MUST INSTANTLY CHARGE THAT GIANT BARGAIN BASEMENT CAPACITOR WHICH FOR A SPLIT SECOND APPEARS AS A DEAD SHORT (THE LARGER THE CAP, THE LONGER THE SHORT) THE ONLY SAVING GRACE IS THAT THE TRANSFORMER HAS A CERTAIN MAXIMUM CURRENT LIMITATION. IF THE SOURCE RESISTANCE OF THE TRANSFORMER IS ABOUT .1 OHM (LOOSELY INTERPRETED AS THE SECONDARY WINDING RESISTANCE AND THIS IS NOT UNUSUAL FOR BIG ONES LIKE THIS) AND THE FILTER CAP CHARGES FROM 0 VOLTS TO 12 VOLTS, FOR AN INSTANT I(MAX)=E(MAX)/R(S). I=12/.1=120 AMPS! SOME WHAT LOWER CURRENTS WILL BE REQUIRED DURING STANDARD CHARGING CYCLES AND YOU THOUGHT YOU'D SQUEAK BY WITH A 6 AMP BRIDGE ON A 6 AMP SUPPLY. WELL, IT ISN'T ALL THAT BLEAK SINCE THIS SAME BRIDGE WILL PROBABLY HAVE A SURGE CURRENT RATING OF 100 AMPS AND A CONTINUOUS RATING OF 6 AMPS. THIS IS A LITTLE TOO CLOSE. PICK SOMETHING LIKE THE MDA980 SERIES WHICH HAS A 25 AMP CONTINUOUS WITH 300 AMP SURGE RATING. THIS BRIDGE WILL MORE THAN SUFFICE FOR A 12 AMP SUPPLY IF THE FILTER CAP IS CHOSEN CORRECTLY.

THE NEXT BIG CONSIDERATION IS THE FILTER CAPACITOR. A LITTLE WAVEFORM ANLYSIS MUST BE PRESENTED HERE SO THAT THE NOVICE APPRECIATES THE DERIVATION AND THE LEARNED SYMPATHY. FIGURE 4 SHOWS THE FILTER SECTION WITH A 9 VOLT TRANSFORMER. THE OUTPUT VOLTAGE FROM THE TRANSFORMER IS 9 VOLTS RMS. AS IT PASSES THROUGH THE BRIDGE THERE IS ABOUT A 3/4 VOLT DROP ACROSS EACH CONDUCTING DIODE (2). THIS MEANS THAT THE PEAK VOLTAGE PRESENTED TO THE CAPACITOR IS GOING TO BE ABOUT:

V(PEAK)=(SECONDARY RMS - DIODE DROP)(1.414)
=(9 - (.75)(2))(1.414) = (7.5)(1.414) = 10.6 VOLTS PEAK

BUT REMEMBER V(PEAK) = V(IN DC) + V(RIPPLE)

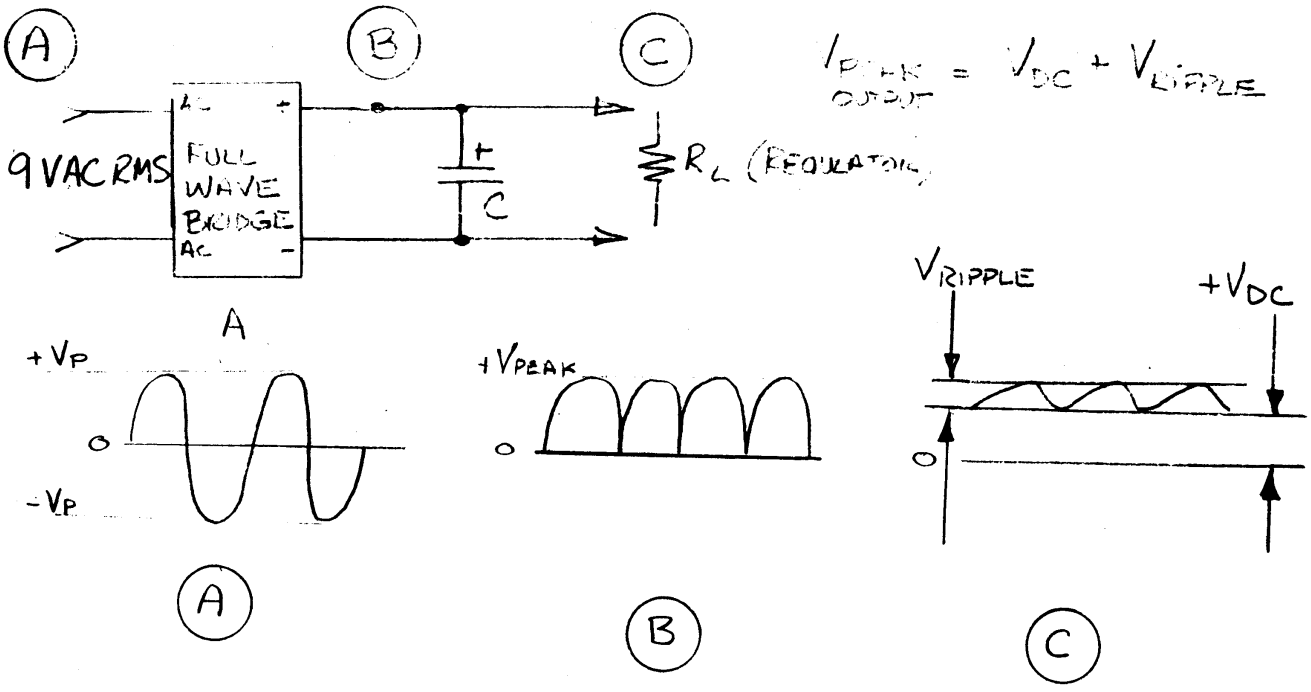


FIGURE 4 FILTER CIRCUIT WAVEFORMS

IT HAS ALREADY BEEN DETERMINED THAT 8 VOLTS IS THE MINIMUM V(IN) FOR A 5 VOLT SUPPLY. THUS THE CAPACITOR MUST BE OF SUFFICIENT SIZE TO ALWAYS STAY CHARGED ABOVE 8 VOLTS. THAT MEANS THAT OF THAT 10.6 VOLTS, 2.6 VOLTS CAN BE RIPPLE. GENERALLY, THAT'S CUTTING IT CLOSE. TWO VOLTS SHOULD BE THE MAXIMUM. CAPACITOR SIZE CAN BE DETERMINED AS FOLLOWS:

V(RIPPLE) = 2 VOLTS I(CONTINUOUS) = 6 AMPS

(3) I = C(DV/DT) OR I = C(V(RIPPLE)/CHARGING TIME)

C IS IN FARADS I IN AMPS DV IN VOLTS DT IN SECONDS

DT = 8.3*10↑(-3) FOR FULL WAVE BRIDGE
DT = 16.6=10↑(-3) FOR HALF WAVE

PLUGGING THESE VALUES IN GIVES:

6 = C(2/8.3*10↑(-3) C = (6)(8.3*10↑(-3)/2
C = .02490 FARADS OR 24,900 MICROFARADS

(DON'T FORGET, CAPS HAVE A +50% -10% TOLERANCE USUALLY)

THIS SHOULD BE CONSIDERED THE MINIMUM ACCEPTABLE CHOICE. 50,000 MICROFARAD WOULD BE REQUIRED FOR A 10 AMP SUPPLY. OVER 120,000 MICROFARAD MAY INTRODUCE CHARGING CURRENT PROBLEMS, EXCESSIVE DIODE HEATING, AND REQUIRE A MORE IN DEPTH ANALYSIS OF THE WHOLE MESS. THE SYSTEM PRESENTED HERE IS DESIGNED FOR 5 OR 6 AMPS BUT CAN EASILY SUPPLY 12 AMPS OR MORE IF ONE REREADS THIS PRESENTATION AND SELECTS THE APPROPRIATE FILTER CAP, COOLING SYSTEM, AND TRANSFORMER BRIDGE COMBINATION. IF 2N3055 APPEARS INADEQUATE, SUBSITUTE A 2N3771. IT IS RATED FOR 200 WATTS AT 30 AMPS AND WOULD BE VIRTUALLY BLOWOUT PROOF IN THESE CURRENT RANGES.

LET'S PRESUME THAT YOU'VE TAKEN MY WORD SO FAR AND BUILT THE SUPPLY, OR AT LEAST A CLOSE APPROXIMATION. NOW OF COURSE, COMES THE FUN PART OF HOOKING IT ALL UP AND TURNING ON THE POWER. IT CANNOT BE SUGGESTED STRONGLY ENOUGH THE NECESSITY FOR OVERVOLTAGE PROTECTION IN THE FORM OF AN SCR CROWBAR CIRCUIT. THE SCELBI-8H HAS A FUSED OVERVOLTAGE SENSING SYSTEM ON EACH CARD BUT IT SHOULD BE CONSIDERED ONLY AS A LAST CHANCE PROTECTION. NORMALLY 7400 SERIES LOGIC HAS A SPECIFIED OPERATING RANGE OF 4.75 TO 5.25 VOLTS. OPERATING BELOW THIS RANGE WILL CAUSE RANDOM AND INDETERMINANT OPERATION. VOLTAGES NOT TOO MUCH ABOVE THESE CAN CAUSE OVERHEATING AND EVENTUAL FAILURE. STANDARD OVERVOLTAGE CIRCUITS ARE DESIGNED TO PROTECT AGAINST A TOTAL CATATROPHIC FAILURE OF THE REG-

ULATOR. THIS TYPE FAILURE MODE RESULTS IN THE APPLICATION OF FULL FILTER VOLTAGE TO THE SUPPLY OUTPUT. IN THE 5 VOLT SUPPLY DISCUSSED EARLIER, 10.6 VOLTS WOULD BE PUT ACROSS THE TTL LOGIC. I DON'T THINK MANY IC'S WOULD SURVIVE!

THE STANDARD OVERVOLTAGE CIRCUIT IS ILLUSTRATED IN FIGURE 5.

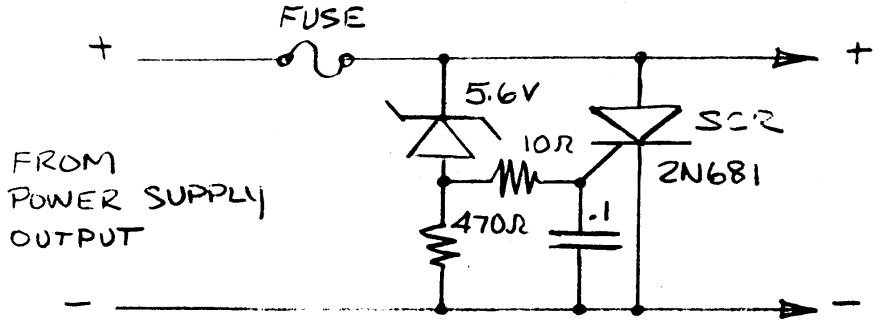


FIGURE 5 STANDARD OVERVOLTAGE CROWBAR

THIS CIRCUIT IS THE STANDARD METHOD AND WILL PROVIDE PROTECTION AGAINST CATASTROPHIC FAILURE. BUT CONSIDER THE HOBBYIST'S OPERATING MODE FOR A MINUTE. HE IS USING 7400 LOGIC, MAY POSSIBLY HAVE GOTTEN SOME MARGINAL CHIPS WITHOUT KNOWING IT FROM MAGAZINE ADVERTIZERS OR FLY BY NIGHT COMPANIES, AND PROBABLY DOES NOT HAVE THE EXTENSIVE TEST EQUIPMENT TO DIAGNOSE INTERMITENT BIT LOSS WHEN OPERATING OUT OF SPEC. THE SYSTEM SHOWN ABOVE WILL NOT TRIGGER THE SCR UNIT APPROXIMATELY 7 1/2 VOLTS. ABOVE THAT VOLTAGE, THE SCR WILL CLAMP THE SUPPLY TO GROUND AND BLOW THE FUSE. THIS IS OF COURSE THE DESIRED RESULT. AT 7 VOLTS NOTHING OCCURS AND THIS CAN BE AS BAD AS 10 VOLTS ON SOME CHIPS. A LOWER ZENER DIODE VOLTAGE CAN BE SELECTED BUT THE VARIATION IN ZENER DIODES AND SCR'S WILL STILL ONLY ALLOW THE COMBINATION TO BE SET AT A TRIGGER VOLTAGE OF PLUS OR MINUS 1 VOLT OF WHERE YOU MIGHT THINK YOU ARE. AN ALTERNATIVE APPROACH IS TO DESIGN A SYSTEM WHICH STILL INCORPORATES THE SCR CROWBAR BUT ALLOWS THE TRIGGER VOLTAGE TO BE PRECISELY DETERMINED. SINCE SUCH A SYSTEM WOULD REQUIRE A VOLTAGE REFERENCE CIRCUIT AS AN INTEGRAL PART, IT CAN ALSO BE USED IN A LIKE MANNER TO SIGNIFY A LOW VOLTAGE CONDITION. THE CIRCUIT FOR THIS DEVICE WOULD APPEAR AS IN FIGURE 6.

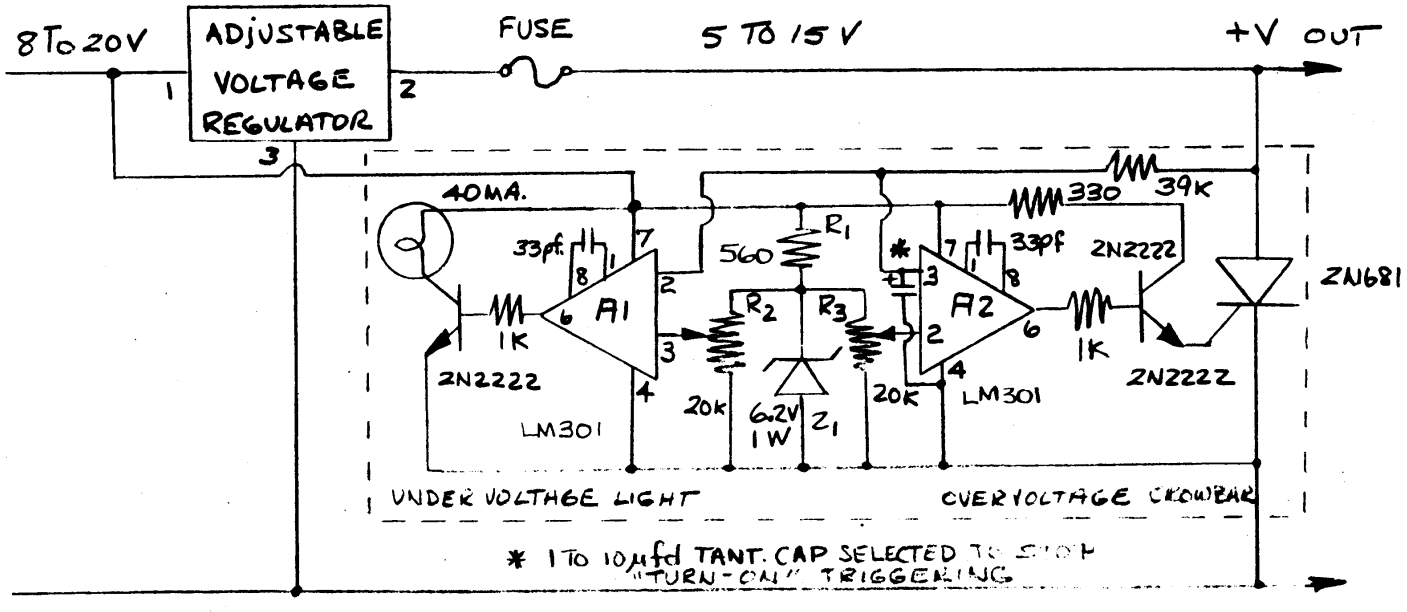


FIGURE 6 PRECISION OVERVOLTAGE DETECTOR

R(1) AND Z(1) FORM A REFERENCE VOLTAGE CIRCUIT. OPERATIONAL AMPLIFIERS A(1) AND A(2) OPERATE AS COMPARATORS AND TRIGGER OVERVOLTAGE (A(2)) AND UNDERVOLTAGE (A(1)) BASED ON THE SETTINGS OF R(3) AND R(2) RESPECTIVELY. THIS CIRCUIT ALLOWS THE TRIGGER POINT TO BE SET AT A PRECISE VALUE AND IN PRACTICE WILL ACTUALLY TRIGGER WITHIN PLUS OR MINUS 3 MV. OF THIS SETTING. AS SUGGESTED, THE OVERVOLTAGE SENSOR IS SET ABOVE 5 VOLTS, USUALLY BETWEEN 5.25 AND 5.50 V, WHILE THE LOW VOLTAGE SENSOR IS SET AT 4.75 V. VOLTAGE OUTPUTS BELOW 4.75 VOLTS WOULD TURN ON A LOW VOLTAGE INDICATOR LIGHT BUT WOULD NOT TRIGGER THE SCR. THIS CIRCUIT PROTECTS AGAINST MARGINAL OPERATION AS WELL AS CATASTROPHIC FAILURE.

OF COURSE, AFTER READING ALL THIS, IT IS NOT EXPECTED THAT EVERYONE WILL BECOME A POWER SUPPLY EXPERT. I DO NOT PRETEND TO BE, BUT I FEEL THAT THE UNIQUENESS OF THE APPLICATION ALLOWS CONSIDERABLE POETIC LICENSE TO BE TAKEN. THE ASSUMPTIONS MADE AND PRESENTED HERE ARE BASED UPON CONSIDERABLE EXPERIENCE AND EXPERIMENTATION. IT IS HOPED THAT THE COMPUTER HOBBYIST WILL EXTRACT THAT INFORMATION MOST USEFUL TO HIM AND BUILD THE BEST SYSTEM WITHIN HIS ABILITIES. IT IS TO THAT END THAT THIS NEWSLETTER IS DEDICATED.

(EDITOR'S NOTE: AS FAR AS WE KNOW, MINI MICRO MART, 1618 JAMES STREET, SYRACUSE, NY 13203 IS ATTEMPTING TO SUPPLY COMPONENTS AND PC BOARDS FOR STEVE'S DESIGNS. SEND THEM A SASE FOR INFORMATION AND ESTIMATED DELIVERY DATES.)

PAST AND FUTURE -- ONE MARK-8

by Terry F. Ritter
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Austin, TX 78741 (512)441-0036

From the beginning, when The Machine first started executing test sequences, it was obvious that the tedious process of program entry (via front-panel switches) had to go. Accordingly, effort was placed into the design of a cheap and unique magnetic-core ROM system for storage of keyboard control software. Keyboard control was chosen for many reasons: a personal dislike for TTY sounds, TTY confinement to a particular sitting position, more availiable commands on the keyboard, and BCD numbers availiable from masked ASCII.

After several months, reasonable software systems for keyboard programming and Baudot octal dumping were tested complete, and allowed the necessary 256-bytes of hand-threaded transformer ROM to be placed into service. Subsequently, the addition of four push-button interrupt commands: HALT, NO-OP, RETURN, and RESTART TO EXECUTIVE has almost eliminated the need for switches.

The Mini-Executive deserves special mention, for in 128 ROM bytes, located anywhere in memory, it allows keyboard programming to replace switch programming. It is also compatable with the basic Mark-8 (in my implementation the keyboard strobe activates a NO-OP interrupt, but other schemes could be used). Required, upon power-up, is the entry of eight steps into RAM via the front-panel switches; full keyboard control is then obtained. ASCII numbers Ø through 7 are not keyboard commands, and are thus octal masked (b_2-b_0) and shifted into the Port Ø display from the right, allowing octal program entry. Ten commands are implemented:

H	display H on Port Ø
L	display L
M	display M
8	load H from display
9	load L
.	load M
SPACE	increment H,L and display M
BACKSPACE	decrement H,L and display M
CAROT	call sub at H,L
PRINT	call Baudot octal dump sub, start dump at H,L

The particular keys used for these commands reflects those availiable on my keyboard, which has a seperate numeric pad and special-function keys. Non-implemented commands (+) and (-) are intended for text-editing bubble up/down systems which would appropriately modify the internal "jump to" addresses when machine-language steps were to be added or deleted.

Other commands are "easily" implemented by inclusion in the command look-up table; some other useful commands would be:

call CRT octal program-display system
call CRT register trace system
call dump to tape system
call tape dump check system
call store from tape system
call EROM erased check system
call program EROM system, etc.

It would be nice if the Mini-Executive appropriately set the TTY and CRT ports whenever accessed. Further, the addition of an audible tone-feedback system in which commands were confirmed by output of a different beep-tone or sequence, would allow more confident and error-free program entry and editing, as well as impressing EVERYONE.

These commands constitute a very bottom-of-the-line control system for machine language programming. It is a common mistake to consider machine language work as a tedious necessary evil. Not only is machine language most efficient in use of our scarce memory resource, but (assuming some text-editing programs) it is FAR superior to Assembler in ease-of-use, and Assembler is commonly thought to be the next step up. Sophisticated languages are nice, but remember that a debugged language implementation may take several man-YEARS of effort. Spend a fraction of that time developing machine-language routines, and you have a system that grows with you.

For the next few years anyway, it may be desirable to consider one type of small computer system oriented around an EROM main memory. Here RAM would be used primarily as scratchpad, and the EROM's used like disk is used in larger systems (almost). Certainly all command implementations would be in EROM, with larger programs or systems on tape. Who will sell me a 1702 programmer board?

COMPUTER LITERATURE LENDING LIBRARY PROPOSED

ROBERT W. KELLEY, 5806 MT. TERMINAL DR., WACO, TX. 76710 THINKS THIS WOULD BE A GOOD TIME FOR THE GROUP TO ESTABLISH A COMPUTER LITERATURE LENDING LIBRARY. THIS COULD BE A FILE CONTAINING REPRINTS OF MAGAZINE ARTICLES, TECHNICAL PAPERS ON COMPUTER HARDWARE,SOFTWARE, ETC.

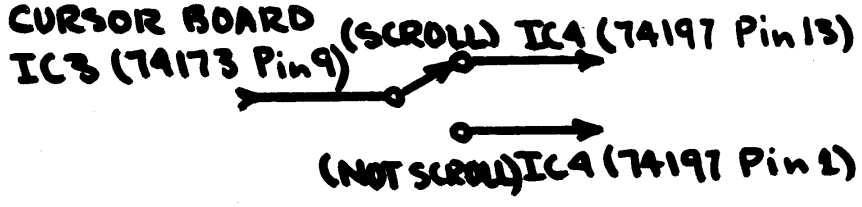
THE COLLECTION AND DISTRIBUTION OF THIS MATERIAL COULD BE ADMINISTERED BY A COMMITTEE. COST OF DISTRIBUTION SHOULD BE BORNE BY THE USER. Editors Note: LET US HEAR FROM YOU "GUYS" THAT WOULD CONTRIBUTE.

MORE SCROLLING MODIFICATIONS FOR THE TVT-1

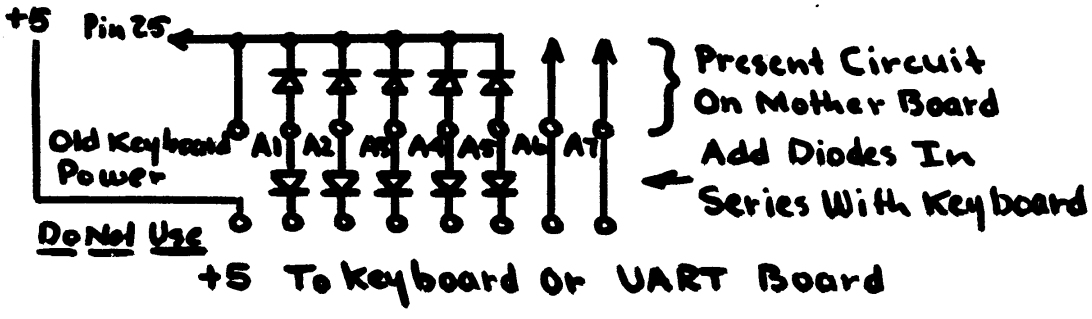
R. D. HOGG, 2516 CASTILLO, SANTA BARBARA, CA 93105 IS NEARING COMPLETION OF HIS PHD IN ELECT. ENGR. AT UNIV. OF CA AT SANTA BARBARA. HE BUILT THE TVT-1 AND HAS INSTALLED THE FOLLOWING SCROLLING MODS. (SCROLLING MEANS ALL LINES POP UP ONE, BOTTOM LINE CLEARS, TOP LINE IS LOST.) HE SAYS:

"THIS SCROLLING CIRCUIT WAS DESIGNED TO TAKE ADVANTAGE OF THE TIMING SIGNALS AVAILABLE IN THE TVT TO AVOID HAVING TO USE CRITICAL ANALOG CIRCUITS. WHAN A SCROLL COMMAND IS RECEIVED, THE CIRCUIT RUNS THROUGH TWO LINES AFTER THE FIRST VERTICAL SYNC PULSE. THE FIRST OF THE TWO LINES RUN THROUGH IS ERASED GIVING A CLEAR LINE AT THE BOTTOM OF THE SCREEN AND MOVING THE REST OF THE DISPLAY UP ONE LINE.

THERE ARE A COUPLE OF MINOR MODIFICATIONS THAT MUST BE DONE TO THE TVT. FIRST, ON THE TIMING BOARD, CUT THE FOIL BETWEEN TEST POINT K AND PIN 5 OF IC7 (7432). RUN A WIRE FROM PIN 5 IC7 TO PIN 40 OF THE MOLEX CONNECTORS. NEXT CUT THE FOIL LEADS GOING TO PINS 24 AND 25 FROM THE CLEAR (HOME) SWITCH ON THE MOTHER BOARD. THE SWITCH CONTACT THAT DID GO TO PIN 25 SHOULD BE CONNECTED TO PIN 9 OF THE 7400 IN THE SCROLLING CIRCUIT. THIS WILL GIVE THE SAME SWITCH FUNCTIONS AS IS SHOWN IN THE SCROLLING SCHEMATIC. AN ALTERNATE WAY TO DO THIS IS TO REMOVE THE CLEAR (HOME) SWTICH ENTIRELY AND INSTALL A SWITCH IN ANOTHER LOCATION AS SHOWN IN THE SCROLLING SCHEMATIC. THE LAST MODIFICATIONS ARE TO CUT THE FOIL ON THE CURSOR BOARD THAT GOES FROM IC3 (7473) PIN 9 TO IC4 (74197) PIN 1. PUT A SWITCH IN AS SHOWN BELOW:

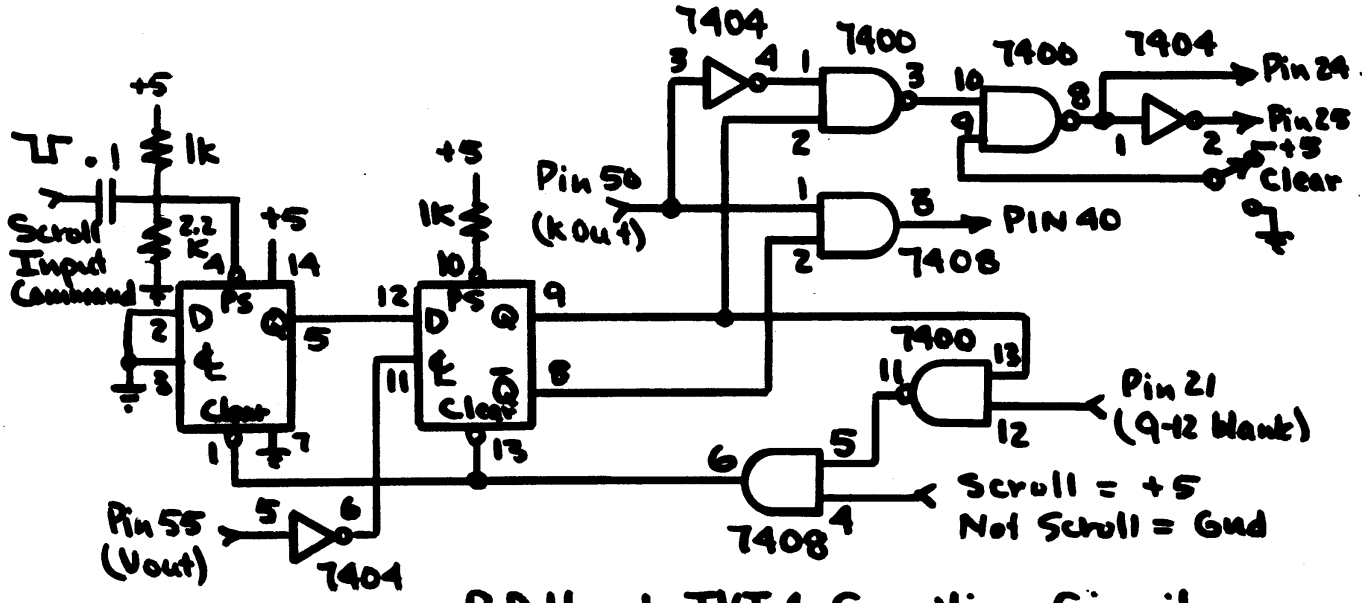


IF ONLY SCROLLING IS TO BE USED, PIN 9 OF IC3 CAN BE PERMANENTLY CONNECTED TO PIN 13 OF IC4. FINALLY, MAKE THE CHANGE SHOWN BELOW TO THE INPUT ON THE MOTHER BOARD. (THIS CHANGE SHOULD BE MADE TO THE INPUT EVEN WITHOUT THE SCROLLING BEING USED IF THE UART BOARD DESCRIBED IN R-E, FEB 1975 IS USED AS HE CLEARS THE INPUTS BY SHORTING THE OUTPUTS OF THE 74157 MULTIPLEXERS TO GROUND WHICH IS A VERY BAD PROCEDURE.)



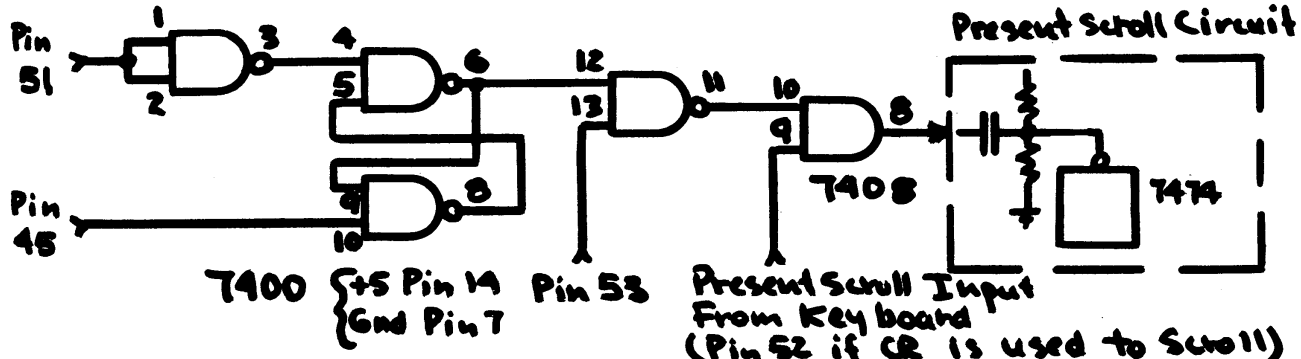
NOTE THAT THE KEYBOARD POWER SUPPLY IS NOW PERMANENTLY CONNECTED TO THE +5 SUPPLY. IT DOES NOT HURT THE KEYBOARD OR UART BOARD NOW TO HAVE A1 THRU A5 GROUNDED.

THE SCROLL COMMAND CAN COME FROM A KEYBOARD SWITCH, MINE IS CONNECTED TO THE CARRIAGE RETURN, OR A SEPARATE SWITCH IF YOU DO NOT WANT TO SEPARATELY DECODE THE CARRIAGE RETURN CODE. SOME KEYBOARDS, SUCH AS THE SWTP KEYBOARD, HAVE AN EXTRA KEY WITH WHICH SEPARATE LEADS CAN BE USED. WITH THIS METHOD OF DOING THE SCROLLING, THERE ARE NO ADJUSTMENTS TO MAKE AND IT WILL NOT UPSET THE OPERATION OF THE TVT WHEN SCROLLING IS NOT USED.



R.D. Hogg's TVT-1 Scrolling Circuit

HERE IS AN ADDITION TO THE ABOVE SCROLLING CIRCUIT WHICH AUTOMATICALLY SCROLLS AT THE END OF A LINE. ALSO INCLUDED IS A MODIFICATION WHICH ALLOWS CR SWITCH TO BE USED FOR SCROLLING."

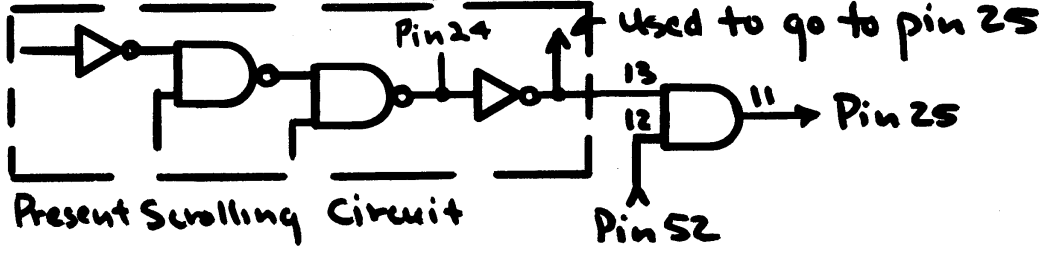


Automatic End Of Line Scroll

7400 added 7408 Part of previous circuit

Changes If You Wish To Use CR For Scroll

(Does not apply if separate switch is used.)

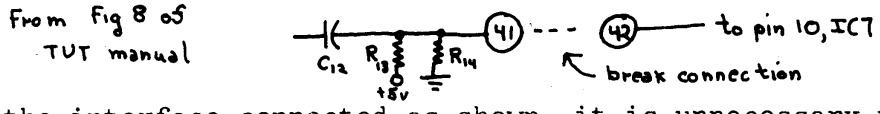


LARRY PLESKAC, 938 PAULA STREET, ESCONDIDO, CA 92027 HAS ALREADY INSTALLED MR. HOGG'S SCROLLING CIRCUIT AND IS VERY PLEASED WITH ITS PERFORMANCE. HE SUGGESTED THAT THIS BE INCLUDED. "THIS IS A SIMPLE MOD TO THE TVT SO THE KEYBOARD WILL CAUSE IT TO SCROLL. REMOVE C5 FROM THE CURSOR BOARD. CONNECT A WIRE FROM THE 0.1 CAP INPUT OF THE SCROLL MOD TO PIN 41. ON THE CURSOR BOARD, CONNECT PIN 41 TO "A". THE CARRIAGE RETURN WILL NOW CAUSE THE TVT TO SCROLL. ALSO, IT IS FUNNY THIS HASN'T BEEN PUBLISHED YET. TO GET THE COMPUTER TO CAUSE THE TVT TO SCROLL ON CR/LF, LOAD 025. THIS ISN'T THE OCTAL SUM OF 015 (CR) AND 012 (LF) OR THE LOGICAL AND, BUT IT WORKS."

WILLIAM E. SEVERENCE, CENTER LOVELL, ME 04016, (207)925-2271 SUPPLIED THE FOLLOWING ARTICLE ON THE TVT & MARK-8. HE WOULD LIKE TO KNOW OF A SOURCE FOR KEYTOPS FOR HIS SWTP KEYBOARD SINCE HE WANTS TO CHANGE A FEW KEYS. HE WOULD LIKE TO FIND A COMPANY THAT WILL DO PC BOARD LAYOUT & FABRICATION FROM A SCHEMATIC AT A RESONABLE PRICE.

TVT - MARK 8 INTERFACE AND MODIFICATIONS TO CLEAR CIRCUITRY (page 1)

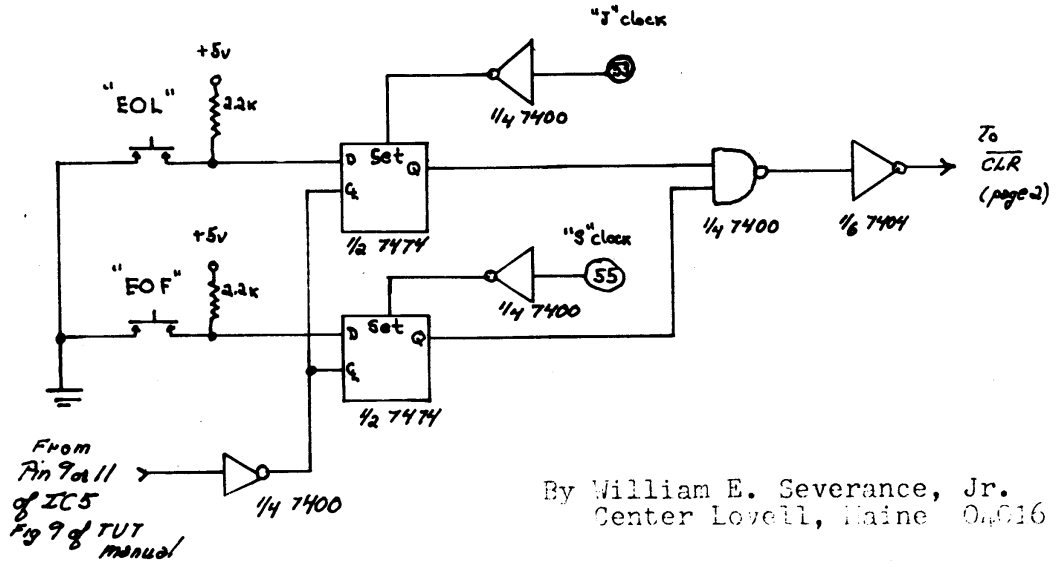
It has been found that the key pressed output of the SWTP keyboard encoder is not sufficiently debounced to drive the Ext. Int. Latch of the Mark 8 as indicated in Appendix A-3 of NL Vol. 1, No. 5. Also, it is advantageous to have a multiplexed interface allowing for use of the TVT alone ("LOCAL") or with the Mark 8 ("LINE"). The accompanying diagram shows this interface constructed of 4 IC's. Keyboard debouncing is best accomplished by the elaborate circuit shown in Fig. 8 of the TVT manual. To provide an insertion point for the interface, make the following modification using the spare stack connectors (41) and (42) .



With the interface connected as shown, it is unnecessary to use a 74123 monostable to condition the Mark 8 Output Port Strobe as is shown in Appendix A-3 of NL Vol. 1, No. 5 and in the Mark 8 manual. Of course, it is still necessary to use a software delay loop when outputing to the TVT.

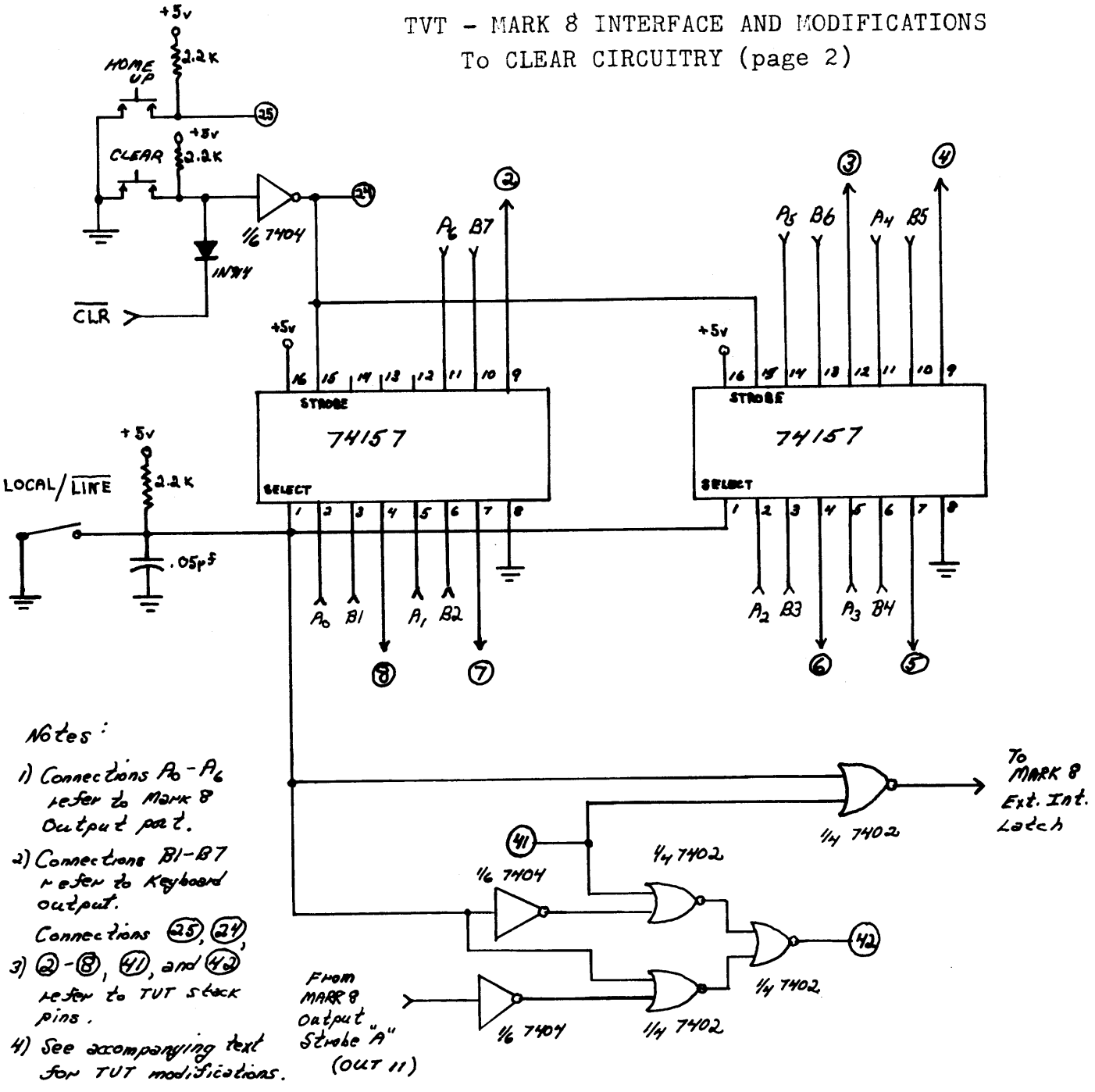
In addition, it was found that the CLEAR function as designed by Don Lancaster for the TVT did not work due to the introduction of random characters should switch S6 of the TVT release the ground on diodes D10-D14 before the ground on stack pin (24) is returned. To overcome this, I have made use of the strobe function of the 74157 data selectors in the interface. When the "CLEAR" button is pressed, a logic 0 appears on stack pins (2) - (8). Also, this allows for the use of a separate push button switch for the "HOME UP" function. To make this modification, cut the foil leading from pin (25) to the cathodes of diodes D10-D14 on the Main Frame circuit board; and remove the existing CLEAR-HOME switch S6; finally, insert the switches and inverter shown on the accompanying diagram. The "CLEAR" function is now TTL compatable, also.

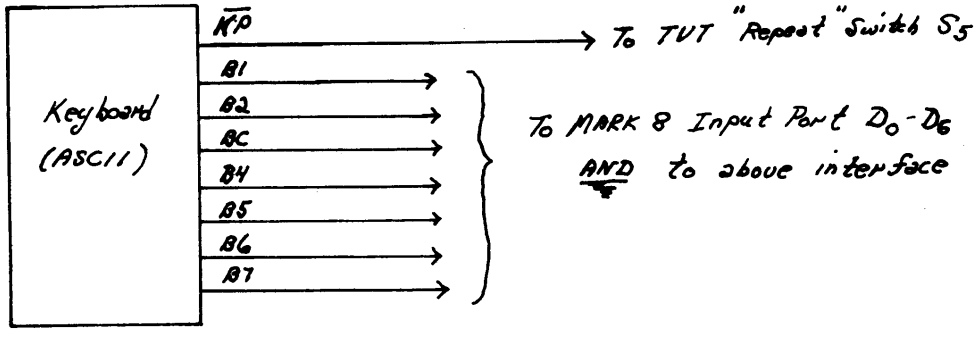
For those that care, the "ERASE TO END OF LINE (EOL)" and "ERASE TO END OF FRAME (EOF)" functions may be provided by the following circuit. "EOL" may be driven optionally by update line "A" from the cursor board for use when carriage returning.



By William E. Severance, Jr.
Center Lovell, Maine 04016

TVT - MARK 8 INTERFACE AND MODIFICATIONS
To CLEAR CIRCUITRY (page 2)

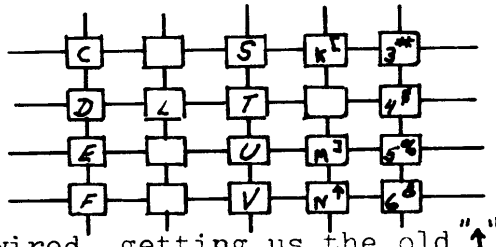




William E. Severance, Jr.
Center Lovell, Maine 04016

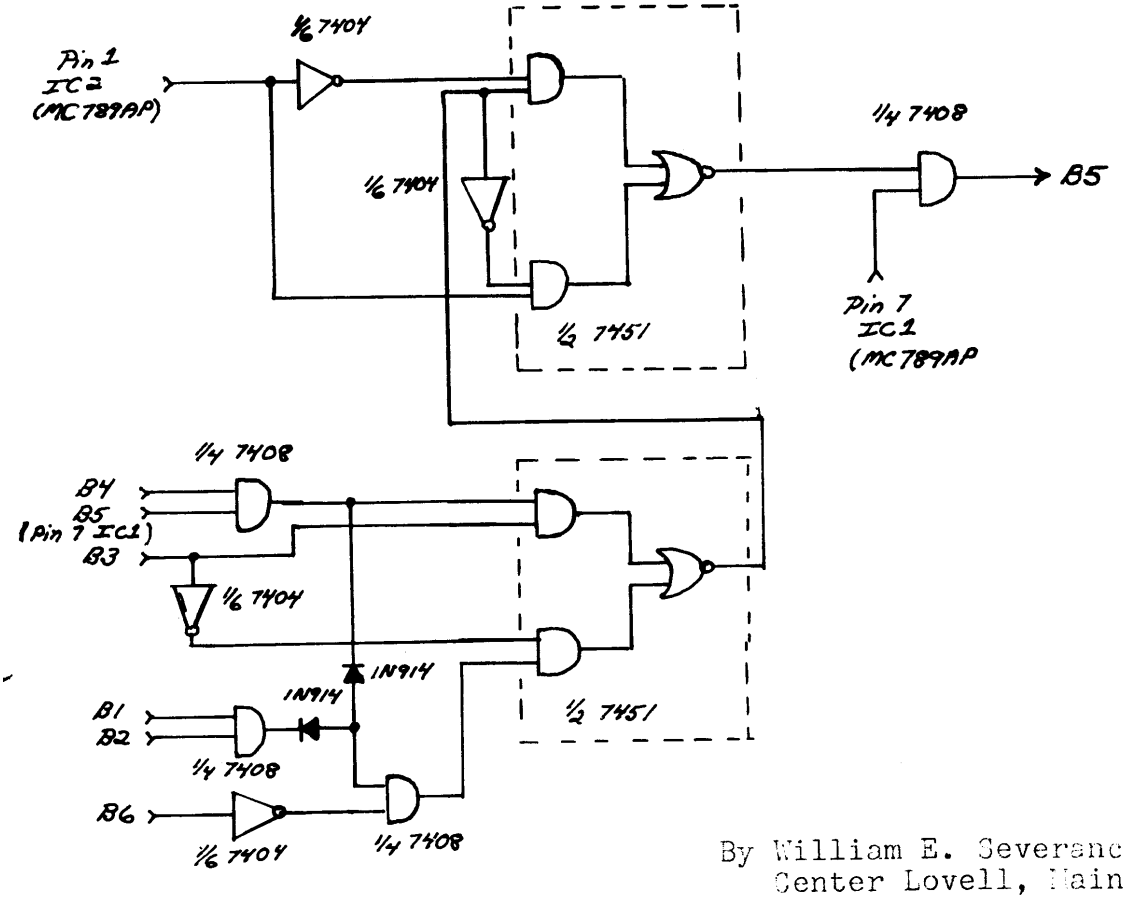
SWTP ASCII KEYBOARD AND ENCODER -- MODIFICATIONS

Any touch typist using this keyboard and encoder will be confused by the upside down pairings of the four keys (, and <); (. and >); (- and =); and (/ and ?). Normally, the pressing "SHIFT" forces a logic 0 onto output line B5. For these four cases, B5 should remain 0 until "SHIFT" is pressed at which time it should go to logic 1. The following circuit detects this special case and accordingly inverts the "SHIFT" action. At the same time, it allows for the standary TTY characters of [("SHIFT K");] ("SHIFT M"); and ↑ ("SHIFT N"). For these, the keyboard matrix must be redefined so that "K" is ASCII 133, "M" is 135, and "N" is 136. Looking at the keyboard matrix of the instruction manual, this places these keys as follows:



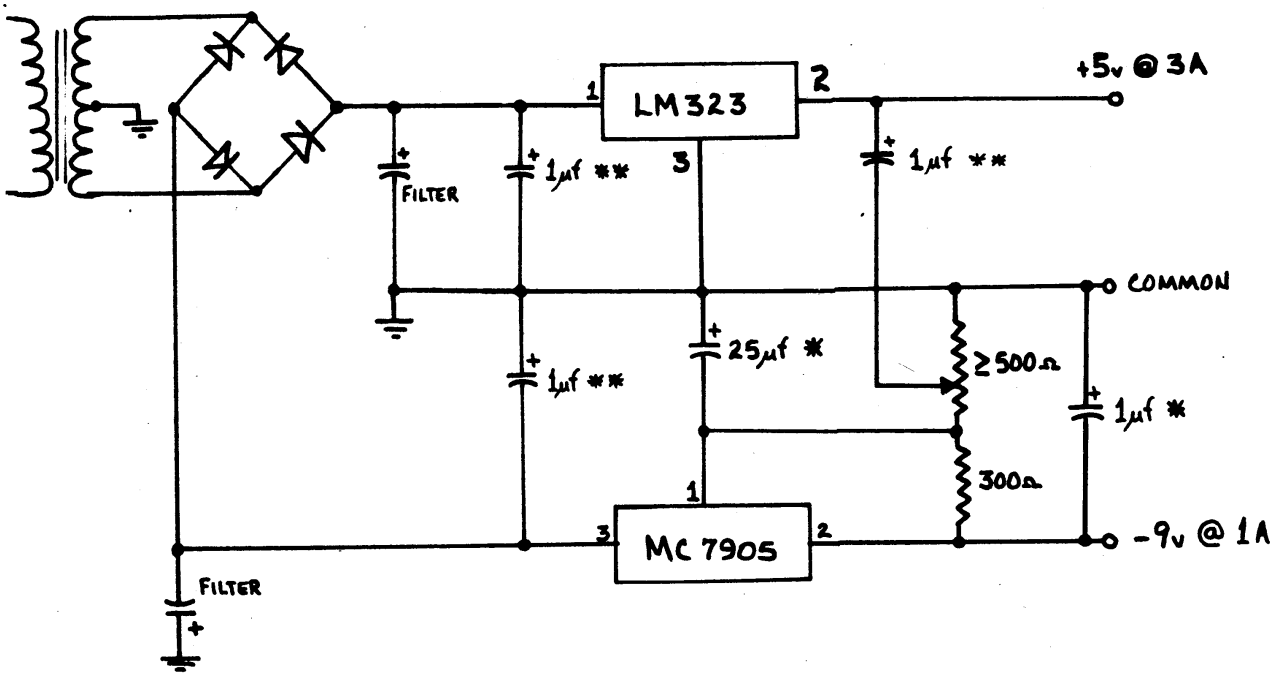
Note: Simply shift common connection of keys "K", "M", and "N" to common of keys "X", "Y", and "Z".

This is easily wired, getting us the old "↑" key back as a spare. Designations B1-B6 below refer to pins at the output connector. Break connections to Pin 1 of IC1 and Pin 7 of IC2 and then wire the circuit below. (I used IC sockets and point to point wiring.)



By William E. Severance, Jr.
Center Lovell, Maine 04016

ROBERT SWARTZ, 195 IVY LANE, HIGHLAND PARTK, IL 60035 472-6660 DAYS, AND 432-6423 EVENINGS IS USING THE POWER SUPPLY CIRCUIT SHOWN BELOW TO POWER HIS MIL MOD-8 COMPUTER. HE HAS HIS MOD-8 RUNNING BEAUTIFULLY AND ALSO DEBUGGED ONE FOR THE UNIVERSITY OF CHICAGO. HE IS GOING TO SERVE AS THE MONITOR-8 SPECIAL INTEREST GROUP EDITOR AND WILL HAVE A SECTION SOON WHICH WILL EXPLAIN BOARD ERRORS ON THE MOD-8 BOARD SETS AND OTHER THINGS OF INTEREST TO MOD-8 USERS.



* NOT NECESSARY BUT IMPROVES RIPPLE REJECTION & TRANSIENT RESPONSE (IF NOT IN PLACE DO NOT SHORT TERMINAL #1 TO GND)

** NEEDED FOR STABILITY

NOTE: CENTER TAP OF XFORMER MUST BE GROUNDED SINCE IT IS USED AS TWO DISTINCT XFORMERS WITH TWO HALFWAVE RECTIFIERS

POWER SUPPLY

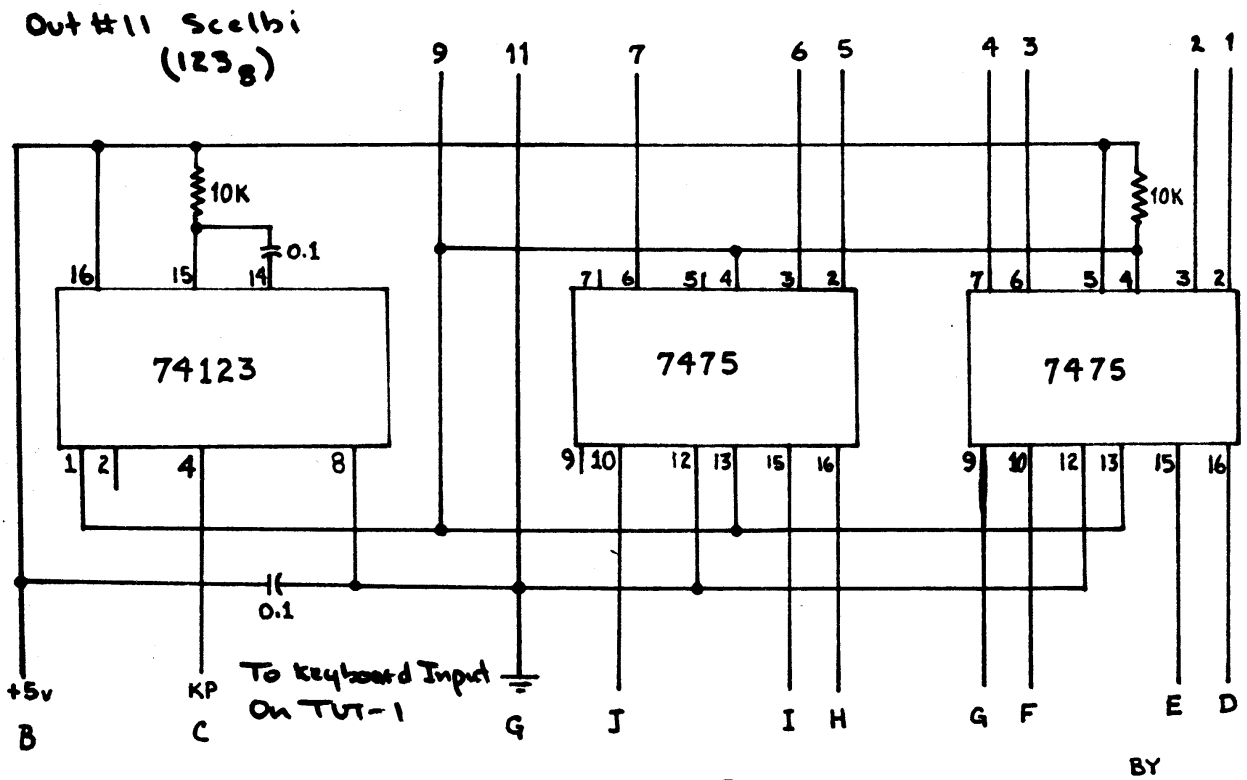
BY

ROBERT SWARTZ

GREGG WEBER, 1000 PLAZA DR., APT. 311-C, STATE COLLEGE, PA 16801 IS A SENIOR IN EE AT PENN STATE. HIS MARK-8 WAS RUNNING IN NOV. WITH AN ASCII KEYBOARD, A TVT, AND A CASSETTE MODEM. HE HAS ACCESS TO A PDP-10 AND SEVERAL PDP-8'S AND IS WILLING TO COPY PROGRAMS FROM ONE FORMAT TO ANOTHER ON A LIMITED BASIS. HIS CASSETTE MODEM IS SIMILAR TO PHIL MORK'S (NL #4) BUT USES A UART. HE RECORDED AND VERIFIED OVER 10:6 BITS WITH NO ERRORS BUT FOUND THAT ON SOME DAYS, TIMING & FREQ. ADJUSTMENTS MUST BE RESET TO COMPENSATE FOR CHANGES IN TAPE SPEED. FIGURING 1/2 THE SPEED ERROR IN RECORDING AND 1/2 IN PLAYBACK, A MAXIMUM SPEED ERROR OF 2.8% OF NOMINAL IS NECESSARY FOR TAPE EXCHANGE IF TAPES ARE TO BE TRADED WITHOUT ERRORS. (JIM FRY DID THE SAME CALCULATION AND CAME UP WORRIED.) COMMON CASSETTE UNITS, ESPECIALLY EL CHEAPOS, WILL NOT BE THIS ACCURATE. THIS CAN BE SOLVED BY 1) SHORTER WORD LENGTHS OF 4 BITS AS IN SCELBI. 2) DON LANCASTER'S AMPLITUDE MODULATED CLOCK AND 3) GREGG'S SOLUTION, RECORDING AN AGREED UPON TEST WORD AT THE BEGINNING OF THE TAPE WHICH CAN BE SAMPLED BY SOFTWARE TO SET UP PROPER READING SPEED. HE SUPPLIED A COPY OF HIS KEYBOARD LOADER PROGRAM WHICH ACCEPTS OCTAL PROGRAM ENTRY, DUMPS MEMORY IN OCTAL ON THE TVT, AND EXECUTES PROGRAMS IN MEMORY. HE WILL SOON ADD CASSETTE LOAD AND DUMP ROUTINES. A LISTING IS AVAILABLE FOR A SASE AND 20 CENTS IN STAMPS.

LESTER C. WARD, BOX 351, MANEO, NC 27954 IS A FIELD ENGINEER FOR WESTINGHOUSE. HE GOT HIS MARK-8 RUNNING JUST AFTER CHRISTMAS. HE USED MOLEX SOCKET PINS THRUOUT AND HAS A SWTP KEYBOARD. HE SUPPLIED A PROGRAM WHICH CONVERTS THE KEYBOARD 0-7 KEYS INTO OCTAL FORMAT AND ENTERS IT IN MEMORY. IT WILL BE SUPPLIED WITH GREGG WEBER'S REPRINT ABOVE.

DR. GEORGE L. HALLER, 1500 GALLEON DR., NAPLES, FL 33940 SUPPLIED THE INTERFACE FOR A TVT-1 TO A SCELBI COMPUTER SHOWN BELOW. A PROGRAM FOR THIS INTERFACE WHICH ACCEPTS A CHARACTER, PRINTS IT ON THE TV, AND STORES IT IN MEMORY WHICH CAN BE DUMPED AS A SUBROUTINE OF THE PROGRAM IS INCLUDED. HE SAYS HIS GOLF HANDICAP PROGRAM WORKS GREAT. (MAYBE HE'LL BE WILLING TO SUPPLY THIS ONE TOO) HE HAS AN ORDER IN FOR A 9K ALTAIR 8800.



SCELBI-TO-TVTI INTERFACE

BY

DR. GEORGE L. HALLER

14 MAR 75

```
003 000 056   SET MEMORY
003 001 005
003 002 066
003 003 000
003 004 125   SET INPUT LATCH
003 005 111   INPUT
003 006 240   SET S FLAG
003 007 120   IS THEIR A CHAR.
003 010 005   NO. GO BACK
003 011 003
003 012 370   LOAD CHAR.
003 013 060   INL
003 014 110   IS PAGE FULL
003 015 020
003 016 003
003 017 050   INH
003 020 106   GO TO OUTPUT
003 021 026
003 022 003
003 023 104   GO BACK FOR
003 024 004   NEXT CHAR.
003 025 003
003 026 123   OUT TO TVT
003 027 026   TIME DELAY
003 030 004
003 031 031
003 032 110
003 033 031
003 034 003
003 035 021
003 036 110
003 037 031
003 040 003
003 041 007   GO BACK TO 023
003 042 056   SET MEMORY
003 043 005   FOR OUTPUT
003 044 066
003 045 000           PROGRAM ASCII KEYBOARD TO
003 046 307   LAM     TV TYPEWRITER AND TO MEM-
003 047 074   IS IT A ORY.  STARTS AT 003-000 THRU
003 050 377   377     003-041.
003 051 150   YES
003 052 067   GO TO HALT
003 053 003
003 054 106   NO GO TO PROGRAM DUMPS MEMORY INTO THE
003 055 026   OUTPUT  TV TYPEWRITER.  STARTS AT
003 056 003           003-042 THRU 003-067
003 057 060   INL
003 060 110   IS L 000
003 061 064   GO TO NEXT PAGE
003 062 003
003 063 050
003 064 104   GO BACK FOR
003 065 046   NECT CHAR.
003 066 003
003 067 377   HALT
```

NOTES: THIS PROGRAM IS SET-UP FOR SCELBI KEYBOARD INTERFACE WHICH REQUIRES OUTPUT 125 TO SET LATCH FOR NEXT CHARACTER. TVT TYPEWRITER IS THE RE MODEL BY LANCASTER WITH C-17 ON CURSOR BOARD CHANGED TO 0.68 UFD. MEMORY LOADED INTO PAGE 005 AND SUCCEEDING PAGES.

ERIC SCHOTT, 208 14TH AVE., JANITA, ALTOONA, PA 16601 FINDS THE BOOKLET FORMAT AWKWARD SINCE HE PREFERS TO PUNCH 3 HOLES AND PLACE THEM IN A THREE-RING NOTEBOOK. HE PROPOSED A NON-REDUCED FORMAT AND A REDUCED FORMAT WHICH MADE GOOD SENSE SO WE'RE TRYING IT FOR THIS ISSUE. IT WILL REMAIN STANDARD FOR THE NEXT 6 ISSUES UNLESS SOMEONE COMES UP WITH A VERY CONVINCING ARGUMENT AGAINST IT.

HE SUGGESTS THAT A CONVENTION BE HELD TO FINALIZE A STANDARDIZATION PROPOSAL. HE SUGGESTS CHICAGO OR PERHAPS THE 1975 NCC IN CALIF.

D. MILLER, 1191 RISA PLACE, SANTA ANA, CA 92705, (714)-838-0070 (AFTER 7 PM) HAS A LISTING OF PERIPHERAL EQUIPMENT HE ACQUIRED RANGING IN PRICE FROM $250 TO $3000. WRITE HIM IF YOUR INTERESTED.

ADAM TRENT, BENDIX, BOX A, ASCENSION, PATRICK AFB, FL 32925 SAYS HE ORDERED A $38 POWER SUPPLY FROM ELECTRONICS UNLIMITED IN OLNEY, MD AND HAS ONLY A CANCELED CHECK TO SHOW FOR IT AFTER SEVERAL MONTHS AND SEVERAL LETTERS. (A LETTER THREATNING TO REPORT THEM TO THE POST OFFICE IF THEY DO DIRECT MAIL ADVERTISING HAS PROVED EFFECTIVE IN A FEW OTHER SITUATIONS. HIS SWTP KEYBOARD HUNG UP TOO. HE BAILED OUT AT A LOSS AND PURCHASED A CLARE/PENDAR MAGNETIC REED SWITCH KEYBOARD FROM HERBACH & RADEMAN, 401 E. ERIE AVE., PHILADELPHIA, PA 19134 FOR $40 THAT IS NICE AND HE WAS IMPRESSED WITH THEIR SERVICE.

TO REMOVE SURPLUS WIREWRAP PINS, HE HAS HAD GOOD LUCK USING A THIN LEAD MECHANICAL PENCIL AND A LIGHT HAMMER TO POUND THEM OUT. HE S AYS HE JUST RECENTLY DISCOVERED THE VIRTUES OF VEROBOARD AND WILL USE IT FOR MOST OF HIS FUTURE PROJECTS.

HE HOPES TO RUN INTO SOME OF THE PARTICIPANTS AT THE DAYTON HAMFEST SINCE HE'S PLANNED HIS VACATION AROUND IT.

STEVE WASH, 7277 BLUFF ACRES DR., GREENWOOD, IN 46142 HAS FOUND IT EXCITING TO WATCH THE HOBBY COMPUTER GROUP MUSHROOM INTO SOMETHING REALLY BIG, SORT OF ANALAGOUS TO THE ENTHUSIASM GENERATED BY PDP-8 USERS.

HE IS EMPLOYED BY INDIANA UNIVERSITY-PURDUE UNIVERSITY AT INDIANAPOLIS IN APPLICATIONS PROGRAMMING ON MINICOMPUTERS. HE WOULD LIKE TO RUN A MICROCOMPUTER ON INTERRUPTS. (FOR A PROFESSIONAL PROGRAMMER LIKE YOU STEVE, THAT MAY MAKE SENSE. FOR A HOBBYIST WITH SMALL MEMORY CONFIGURATIONS AND VIRTUALLY NO PROGRAMMING SKILL, IT SEEMS HOPELESSLY DIFFICULT.) HE PROPOSED SOME PRELIMINARY IDEAS FOR A PERIPHERAL FUNCTION PORT AND SUGGESTS ADDING A REAL TIME CLOCK TO THE MARK-8. HE WILL SUPPLY DETAILS AND SCHEMATICS AS SOON AS HE GETS THESE DESIGNED AND RUNNING.

DAVE CHAPMAN, 3420 S. PERRINS RD., MEMPHIS, TN 38118 CAME THRU WITH BEAUTIFUL SCHEMATIC DRAWINGS OF THE PRECISION SYSTEMS POWER SUPPLY. SEND A SASE AND 30 CENTS IN STAMPS FOR A PHOTOCOPY. (LATEST REPORTS ARE THAT PRECISION SYSTEMS HAS LONG SINCE SOLD THEIR SUPPLY AND THAT THEY DON'T EVEN ANSWER THE PHONE OR LETTERS NOW.)

H. N. CAMPBELL, RD 3- BROCKWAY ROAD, MORAVIA, NY 12118, (315)497-0239 TOOK A COUPLE OF MONTHS GETTING MARK-8 COMPONENTS, A COUPLE OF WEEKS ASSEMBLING, AND IT LOOKS LIKE A COUPLE OF YEARS TROUBLESHOOTING. HIS PROBLEM SEEMS TO BE BAD IC'S. MORAL, USE SOCKETS AND/OR CHECK OUT THE IC'S CAREFULLY. (A MARK-8 IC CHECKER PERIPHERAL HAS TO BE A HIGH PRIORITY PROJECT FOR SOMEBODY. WE COULD SURE USE IT.)

BRIAN M. CHESIRE, WA5PPOK, 113 E. ELBERTA #8, ATWATER, CA 95301 WAS A HAM FOR 8 YEARS AND AN ELECTRONIC TECH FOR 10 AND WASN'T INTERESTED IN COMPUTERS UNTIL HE READ THE NEWSLETTER AND SOME RECENT ARTICLES. HE WILL BUILD ONE SOON AND IS STILL TRYING TO DECIDE WHICH ONE.

OTTO BARTH, ELBA TOOL CO., 601 ESTES AVENUE, SCHAUMBURG, IL 60172, (312)894-4100 SAYS THAT ALL THAT RGS DOES IS ADVERTISE. HE STILL HASN'T RECEIVED HIS KEYBOARD ENTRY KIT WHICH WAS PAID FOR ON OCTOBER 3, 1974. HE GOT THE WIRE WRAP VERSION WHICH HE DESCRIBES AS A HELL OF A JOB BUT HE LIKED IT AND CHANGES ARE EASILY MADE. HE HAS HIS DOUBTS ABOUT RGS'S I/O AND IS CONSIDERING GOING TO SOMEBODY ELSE FOR PC BOARDS. HE SAYS THE MANUAL ISN'T WORTH THE PAPER ITS PRINTED ON.

JOHN C. NEVES, 930 PALO ALTO AVE., PALO ALTO, CA 94301 WOULD LIKE TO SEE A CATCHIER MORE ALL-ENCOMPASSING NAME LIKE "MICROCOMPUTER HOBBYISTS" OR SOMETHING LIKE THAT. HE PROPOSES THIS NOVEL SUGGESTION FOR MARK-8 BOARD USERS. THE BOARD HAS CONNECTOR SPACINGS THAT ARE THE REGULAR EDGE CONNECTOR SPACING SO FILE THE EDGES OF THE BOARDS SO THEY WILL PLUG RIGHT INTO THE CONNECTORS. THIS MAKES TROUBLE SHOOTING AND MAKING C HANGES EASIER.

KEN A. MCGINNIS, MD, PO BOX 2078, SAN MATEO, CA 94401 ORDERED 32 2102'S FROM JIM FRY AND 2 PHI-DECKS, A CASSETTE DECK THAT FEATURES COMPLETELY ELECTRONIC CONTROL, CAN SEARCH A 30-MINUTE CASSETTE IN 20-25 SECS, IS DUAL TRACK, AND HAS OTHER IMPRESSIVE SPECIFICATIONS. KEN SAYS HE WOULD SUGGEST ANYONE ELSE WANTING THEM TO ORDER THRU HIM SINCE THE COMPANY WILL TOTAL ORDERS FOR ONE YEAR FOR DISCOUNT. 1 COSTS $95, 10 COST $85, ETC. REQUEST INFORMATION FROM THE ECONOMY CORPORATION, PO BOX 25308, OKLAHOMA CITY, OK 73125 (405)528-8444-EXT. 76. (JIM FRY AND ONE OTHER PARTICIPANT ALSO SENT IN INFO ON THE PHI-DECKS.)

KEN THINKS THE ALTAIR 8800 IS A FANTASTIC UNIT AFTER USING BOB ALBRECHT'S PCC UNIT. HE SUGGESTS THAT IF YOUR NOT COMMITTED TO AN 8008, DO SOME SERIOUS STUDY ON 8080'S. THE INTERRUPT ON THE 8080 MAY BE WORTH THE PRICE DIFFERENCE.

KEN ALSO SUPPLIED A CALCULATOR INTERFACE THAT WILL BE INCLUDED IN THE NEXT NEWSLETTER.

M. PAUL FARR, 3723 JACKSTRADT ST., SAN PEDRO, CA 90731 SAYS PAUL MORK'S MUSIC PROGRAM WAS JUST TOO MUCH! PAUL HAS FINISHED A TARBELL CASSETTE INTERFACE AND IS TOTALLY IMPRESSED. HE HAS NOT HAD A BAD TRANSFER IN WEEKS OF STEADY USE USING A MODEL 3913A MONTGOMERY WARD CASSETTE MACHINE. IT IS COMPATIBLE WITH ANSI STANDARD, 800 BITS/INCH, 1500 BITS PER SEC, PHASE ENCODED FORMAT. 256 BITS LOADS IN 2 SECONDS.

HE SAYS ELECTRONICS HAS ALWAYS BEEN A FASCINATING EVER CHANGING FIELD BUT HE HAS NEVER BEEN INVOLVED IN ANY PASTIME AS EXCITING, FAST MOVING AND ENGROSSING AS THIS AMATEUR COMPUTER ACTIVITY (AND HE'S TRIED SOME PRETTY INTERESTING THINGS LIKE SOARING AND HANG-GLIDING).

VICTOR W. AMOTH & THOMAS R. AMOTH, 228 FOX ROAD, MEDIA, PA 19063 ARE A FATHER AND SON TEAM. SON TOM DESIGNS AND DEBUGS CIRCUITS THAT FATHER VICTOR BUILDS. A 22 PAGE DISSERTATION BY TOM WAS INCLUDED ON MARK-8 AND TVT SUBJECTS. (I'M STILL INVOLVED IN READING IT AND WILL DECIDE HOW TO GET THE INFORMATION TO PARTICIPANTS NEXT ISSUE.)

DOUG AAMOLD, #9 COLONIAL VILLAGE, BROOKINGS, SD 57006 LOANED ME A COPY OF THE ALTAIR 8800 MANUAL. HE SUGGEST THAT IT MAY HELP IN EVALUATION OF THE SYSTEM AND THAT MITS AT PRESENT SEEMS TO BE RELUCTANT TO OUTPUT MUCH DOCUMENTATION, SO CAREFUL CONSIDERATION IS WARRANTED. HE NOTES ALSO THAT THE 8101 USED FOR MEMORY SEEMS TO BE RATHER DIFFICULT TO GET HOLD OF.

GERALD MCKEE, PO BOX 4667, SAN JOSE, CA 95126 HAS A RUNNING RGS-008A WITH 2K OF MEMORY AND A SN001 CASSETTE PERIPHERAL. UNFORTUNATELY HE'S A TV BROADCAST ENGINEER THAT HAS BEEN OUT OF WORK NEARLY A YEAR AND WOULD APPRECIATE ANY EMPLOYMENT LEADS. DUE TO NECESSITY, HIS RGS COMPUTER, TVT, HAM AND TEST EQUIPMENT AND OTHER STUFF ARE FOR SALE. SEND A SASE FOR DETAILS.

DE WALTER EKSTRAND, PO BOX 1260D, SOUTH GATE, CA 90280 IS BUILDING A MARK-8 AND HAS ORDERED 2 ALTAIR 8800'S WHICH WILL BE USED AS A PROCESSOR FOR A DIABLO PRINTER AND RTTY 19, 32, & 33'S INTERFACED TO A SC1100 INTELIGENT TERMINAL ON PHONE LINES. HE HAS SHEET METAL EQUIPMENT AND MAY BE ABLE TO HELP OTHERS WITH CUSTOM WORK. HE WOULD LIKE TO HELP START A LOCAL GROUP IN THE LA AREA.

MICHAEL E. LINDSEY, 2625 FAIRGREEN DR., PITTSBURGH, PA 15241, (412)835-9126 HAS AN INTELLEC-8 CROSS ASSEMBLER RUNNING ON A PDP-10 AND WILL BE ABLE TO ASSEMBLE CODE FOR ANYONE THAT SENDS HIM A SOURCE DECK OR PAPER TAPE AND RETURN POSTAGE. HE CAN ALSO RUN FORTRAN, BASIC AND ALGOL PROGRAMS FOR YOU ON A LIMITED BASIS.

GARY E. JOHNEY, PSC BOX 6967, APO SAN FRANCISCO, CA 96237 CAN READ AND WRITE INTO MEMORY ON HIS MARK-8 BUT CAN'T GET PAST THE FIRST TEST. SO FAR HE HAS FOUND SIX BAD IEU IC'S.

JONATHAN A. TITUS, TYCHRON, PO BOX 242, BLACKSBURG, VA 24060 (703)951-9030 SUGGESTS THAT EVERYONE SEND INFORMATION IN IN A STANDARD FORMAT, READY FOR PUBLICATION. EACH COULD THEN BE ASSIGNED A TECHNICAL REPORT NUMBER AND ABSTRACTS COULD BE PRINTED IN THE NL'S AND PARTICIPANTS COULD ORDER COPIES AT A COST TO COVER COPYING AND MAILING. THIS WOULD TEND TO CULL OUT JUNK MATERIAL SINCE PEOPLE WOULD NOT BE WILLING TO PUT TIME IN ON IT. (IT SEEMS A LITTLE EARLY TO BE TOO RESTRICTIVE. NEWLETTERS USUALLY DIE BECAUSE PEOPLE QUIT SUPPLYING MATERIAL. LET'S KEEP IT EASY FOR THE PRESENT AND SOMEHOW WE'LL TRY TO PUT SOME ORDER INTO THE MATERIAL SUBMITTED.) MR. TITUS SAYS EL INSTRUMENTS, 61 FIRST ST., DERBY, CT 06418 WILL BE ANNOUNCING AN 8080 SYSTEM SOON. HE REPORTS THAT HE HAS HAD AN OPPORTUNITY TO TALK WITH OTHER MICROPROCESSOR USERS AND THAT IT SEEMS NO ONE IS VERY IMPRESSED WITH THE ALTAIR 8800 SYSTEM. MITS DID A SLICK PROMOTIONAL JOB BUT THEY ARE SLOW TO DELIVER AND HE UNDERSTANDS THAT MANY OF THE PERIPHERALS MENTIONED IN THEIR ADS SIMPLY DON'T EXIST. MR. TITUS SAYS HE WILL BE HAPPY TO PUT TOGETHER SOME INFO ON THE INEXPENSIVE PAPER TAPE READER AND WILL SUBMIT IT AS THE FIRST TECHNICAL REPORT.

JIM MCCORD, 330 VEREDA LEYENDA, GOLETA, CA 93017 HAS A TVT RUNNING AND HOOKED TO AN OLD HONEYWELL 112 THRU A SERIAL UART INTERFACE. HE HAS ADDED SCROLLING TO HIS TVT (TRY DAVE HOGG'S CIRCUIT). HE'D LIKE A DENSER DISPLAY. (WRITE THE DIGITAL GROUP AND ENCOURAGE THEM TO RUSH THE 16 LINE, 64 CHARACTER DR. SUDING UNIT TO COMPLETION.) JIM IS GOING TO BUY AN ALTAIR 8800 AND THINKS THAT THE PRE MARCH 1 PRICE WAS A LOSS LEADER AND THAT THEY PLANNED TO MAKE IT UP ON THEIR PERIPHERALS. JIM IS VERY INTERESTED IN A BASIC. HE IS PLEASED WITH JAMES AS A SUPPLIER--UNBELIEVABLE QUICK SERVICE, LOW FAILURE RATE, AND QUICK REPLACEMENT OF BAD PARTS. HE SAYS THAT THE INTERSIL PDP-8 CHIP IS AVAILABLE NOW. (PLEASE GET ME MORE INFO ON THIS AVAILABILITY QUICK.) CAN ANYBODY RECOMMEND A BEGINNERS INTRO TO DIGITAL ELECTRONICS THAT WILL BRING A NOVICE UP TO THE LEVEL NECESSARY TO MAKE EFFECTIVE USE OF SOMETHING LIKE THE TTL COOKBOOK.

R. RILEY, PULSAR R & D LABORATORIES, PO BOX 4310, FLINT, MI 48504 WANTS TO CONTACT OTHERS INTERESTED IN BUYING A 16 BIT, 1.6 MICROSEC, 1K WORD COMPUTER FOR UNDER $1000 AND A DUAL CASSETTE UNIT FOR UNDER $200 PER PAIR. HE WANTS $5 TO COVER PRINTING, HANDLING, AND POSTAGE COSTS. (I SUGGESTED TO HIM THAT PEOPLE ARE GETTING TIRED OF BUYING $5 "PIGS IN A POKE" AND THAT A LITTLE MORE INFORMATION WOULD SEEM NECESSARY. A 4K PDP-11/LSI CAN BE OBTAINED FOR UNDER $1000 AND THE CASSETTE DECKS SOUND LIKE PHI-DECKS. HE'S GOING TO HAVE TO SEND MORE INFO THAN THAT BEFORE I'LL RECOMMEND THAT YOU SPEND $5 ON AN INFO PACKAGE.)

ROBERT SWARTZ, 195 IVY LANE, HIGHLAND PARK, IL 60035, 472-6660 DAYTIME, 432-6432 EVENINGS IS OUR MOD-8 CONFIGURATION EXPERT. HE HAS HIS OWN SYSTEM RUNNING BEAUTIFULLY AND HAS RECENTLY DEBUGGED ONE FOR THE UNIVERSITY OF CHICAGO. HE IS GOING TO SEND MATERIAL FOR A SPECIAL MOD-8 SPECIAL INTEREST SECTION FOR THE NL AND IS HARD AT WORKING DESIGNING A CIRCUIT FOR THE CHANGE OVER TO THE 8080 SINCE MIL'S BANKRUPTCY CUT OFF THE FORMER SOURCE OF THEM. HE LUCKED OUT AND OBTAINED ONE OF THE MONITOR-8 ROM'S WITH A BAD BIT AND HAS IT RUNNING OK NOW AND IS VERY IMPRESSED WITH IT. IF YOUR PLANNING A MOD-8, IT WILL BE WORTH YOUR TIME TO CONTACT ROBERT FIRST.

KENDALL STAMBAUGH, 5009 GUIDE MERIDIAN, BELLINGHAM, WA 98225, 734-9424 SAYS THE NL HAS OPENED UP A NEW WORLD OF WHAT CAN BE FOR HIM AND THAT HE HAS TO FIGHT THE URGE TO START ON ALL FRONTS TRYING TO CATCH UP WITH EVERYONE OVERNIGHT.

DAVID A. BARKER, 1101 GRAD HOUSE WEST, WEST LAFAYETTE, IN 47906 (317)-743-5107 WILL FINISH HIS MARK-8 IN TWO WEEKS, AND HIS PHD SOON. HIS FIRST MAJOR PROJECT WILL BE AN ADAPTIVE MORSE CODE RECEIVER. HE'S WA9NQN, AMATEUR EXTRA.

ROGER L. SMITH, SMITH ENTERPRISES, 4501 E. NANCY LANE, PHOENIX, AZ 85040, (602)968-0774 GOT SEVERAL REQUESTS AFTER HIS RE UART ARTICLE APPEARED FOR AN ASCII TO BAUDOT CONVERTER. HE SAYS ITS BEST TO HANDLE IT WITH SOFTWARE BUT THERE ARE MANY HAMS AND OTHERS THAT ARE USING BAUDOT TTY'S WITHOUT A COMPUTER THAT ARE STILL INTERESTED IN HARDWARE CONVERSION. IT'S COMPLICATED BUT CAN BE DONE WITH $11 WORTH OF IC'S. RE HAS AGREED TO PUBLISH THE CONSTRUCTION PLANS BUT MR. SMITH HAS AGREED TO SEND AN ADVANCE COPY TO THOSE INTERESTED FOR $1.00 TO COVER XEROX COST. THE ASCII TO BAUDOT CONVERTER WITH PC BOARD SHOULD BE AROUND $20 AND BAUDOT TO ASCII WOULD ADD ANOTHER $10 OR SO. HE ALSO HAS AN UPCOMING ARTICLE ON PROMS IN R-E AND ANOTHER ON UARTS IN P-E.

MAYNARD M. DYE, 4986 SAN JOAQUIN DR., SAN DIEGO, CA 92109 (714)274-8406 CANCELLED HIS ORDER FOR AN ALTAIR 8800, ORDERED A CREED TTY FROM WILCOX ENTERPRISES, AND A KEYBOARD FROM MICRO-MINI-MART. HE'S TRYING TO DECIDE WHICH CPU CONFIGURATION TO USE AND PRESENTLY FAVORS THE MIL-MOD-8 VERSION. (WITH THE DEMISE OF MIL, CHECK CAREFULLY TO FIND OUT WHAT KIND OF DELIVERY YOU CAN GET BEFORE SENDING MONEY TO ANYONE.) HE WILL USE HIS COMPUTER TO DO ALL OF HIS MOTEL BOOKKEEPING RECORDS AND HIS PERSONAL INCOME TAX RECORDS.

J. A. STARK, MD, 485-34TH ST., OAKLAND, CA 94609 ORDERED 24 2102'S FROM JIM FRY AND HAS MODIFIED THE MARK-8 MEMORY BOARD AND IS WILLING TO SEND US THE CHANGES NECESSARY. HE SAYS HE MAY NEVER DO ANOTHER BIG PROJECT WITHOUT PLATED THRU HOLES AND HAS HAD A BAD TIME WITH THE WIRED BUS AND IS REPLACING IT WITH MOLEX CONNECTORS. HE INTENDS TO TRY THE MOD-8 VERSION SOON.

R.S. FORMAN, 2421 N.W. JOHNSON, PORTLAND, OR 97210 HAS PURCHASED THE $9 ALTAIR 8800 CONSTRUCTION MANUAL.

GARY W. KRAMER, PURDUE UNIVERSITY, DEPT. OF CHEM., WEST LAFAYETTE, IN 47907 IS A RESEARCH ASSISTANT AND WILL USE A MARK-8 AS A FRONT END PROCESSOR/BUFFER FOR A HP9820 PROGRAMMABLE CALCULATOR WHICH WILL ALLOW THEM TO INTERFACE THEIR GAS CHROMATOGRAPHS TO THE CALCULATOR. THE MICRO WILL BE A FANCY DATA BUFFER WHICH WILL FEED DATA INTO THE CALCULATOR. GARY SUGGESTS LOOKING INTO THE MONOLITHIC SYSTEMS MEMORY ARRAY OR THE DATARAM MINI CORE MEMORY AVAILABLE THRU ALTAJ ELECTRONICS. HE HAS A SET OF EACH AND SAYS THEY ARE NICE BOARDS WITH GOOD DOCUMENTATION, ESPECIALLY T HE DATARAM UNIT.

ROBERT E. WHITMOYER, MD, OLD DOLLAR RD., BOX 13, RD #1, HEUVELTON, NY 13654 IS AN EYE SPECIALIST AND IS RESEARCHING A SYSTEM TO HANDLE OFFICE A CCOUNTING, MEDICAL FORMS, AND DATA PROCESSING. HE QUESTIONED HEATHKIT FOR INFORMATION ON UPCOMING KITS BUT THEY WOULD NOT COMMENT. (THAT PROBABLY MEANS THEY ARE ABOUT TO ANNOUNCE ONE.) HE WOULD LIKE TO DO SOME MEDICAL INSTRUMENTATION ON ELECTRICAL MANIFESTATIONS OF THE VISUAL SYSTEM ALSO.

W. H. BURTNER, RR2, BOX 267, VALPARISO, IN 46383 SAYS HE GOT THE RGS-008A PC BOARD KIT AND ITS A REAL TINKER TOY JOBBIE. THE I/O DEVICE IS A SOCKET WITH NO PLACE TO MOUNT IT. THE MANUAL IS 25 PAGES NOT WORTH THE PRICE OF THE PAPER. HE FEELS EVEN WORSE WHEN HE COMPARES IT TO THE ALTAIR 8800 KIT HE JUST RECEIVED. ALL FIRST CLASS MATERIAL AND A REALLY SHARP LOOKING RIG. THE SWTP TVT-II COMES AS TWO PC BOARDS AND A HANDFUL OF PARTS. THEY SAID "NO CASE" BUT HE COULDN'T BELIEVE THEY WOULD NOT FURNISH SOME KIND OF CHASSIS TO MOUNT IT ON. IT WORKS GREAT--BUT WHAT A HASSLE TO GET IT ALL TOGETHER. WOULD YOU BELIEVE HE ALSO HAS A MARK-8 UP AND RUNNING THAT WILL BE USED TO CONTROL A MUSIC SYNTHESIZER.

PERRY A. COLSTROM, 5750 N.E. MADISON ST., MINNEAPOLIS MINN 5543[illegible] OCCASIONALLY COMES ACROSS PAPER TAPE PUNCHES AND READERS, CARD RE[illegible] ERS, MAG TAPE HEADS & DRIVES, AND KEYBOARDS. YOU CAN SEND HIM A S[illegible] FOR CURRENT OR FUTURE ITEMS AND PRICES. HE WILL INCLUDE DOCUMENTAT[illegible] WHEN POSSIBLE. (PLS NOTE THAT THE ADDRESS GIVEN ABOVE IS CORRECT... THE ONE IN NL #5 IS NOT.)

D.W. EKSTRAND, P.O. BOX 1260, SOUTH GATE CA 90280, RECOMMENDS A BOOK ENTITLED "INTRODUCTION TO DATA PROCESSING" FOR THOSE IN NEED OF A GOOD BASICS BOOK (AND ALSO FOR THOSE COMPLAINING ABOUT THE 8080 HEX). IT'S PUBLISHED BY PRENTISS HALL AND THE AUTHOR IS FR CRAWFORD (LIB CODE NUMBER IS 651.26).

K.W. HAMILTON, DARTEK ELECTRONICS, P.O. BOX 2460, DARTMOUTH NOVA SCOTIA B2W 4A5, WILL GLADLY PROVIDE A FLYER LISTING PARTS AND PRICES TO ANY OF YOU CANADIANS HAVING TROUBLE GETTING PARTS.

LARRY PLESKAC, 938 PAULA ST., ESCONDIDO CA 92027, IS VERY HAPPY WITH THE SCROLLING MODIFICATION PROVIDED BY MR. HOGG (AND INCLUDED IN THIS MONTH'S NL). HE ALSO HAS THE DIGITAL GROUP'S CASSETTE INTERFACE UP AND WORKING. HE MENTIONS THAT THE ZENER DIODE IN THE MODULATOR CIRCUIT IS BACKWARDS. ALSO, THE 470 OHM RESISTOR IN THE DETECTOR CIRCUIT SHOULD BE SELECTED FOR A 5 VOLT OUTPUT (HIS PUT OUT 8 VOLTS PRIOR TO MAKING THE CHANGE). AND, USING PARALLEL IN AND OUTPUTS WILL REDUCE THE SOFTWARE. HIS SWTP KEYBOARD PUTS OUT A SLASH WHEN NO KEY IS PRESSED, AND HE IS WONDERING IF OTHERS ARE GETTING THE SAME RESULT?

DAVID YULKE, 121 LIBERTY AVE., SILDEN N.Y. 11784, WILL BE OFFERING A PROM PROGRAMMING SERVICE AFTER APRIL 15TH. HE WILL CHARGE $5 TO PROGRAM YOUR CHIP. THE PROGRAM SHOULD BE SENT TO HIM ON PAPER TAPE IN BNPF, HEX, OR OCTAL (MONITOR-8) FORMAT. HE CAN HANDLE 1702, 1702A, 5202, AND 5203'S. HE IS WORKING ON A UART COMPATIBLE VERSION OF MONITOR-8 & HAS MODIFIED THE LOAD SYMBOLIC & PROM PROG ROUTINES. HE'LL SUPPLY A LISTING AS SOON AS IT IS THOROUGHLY DEBUGGED.

J. SCOTT WILLIAMS, PO BOX 932, BELLINGHAM, WA 98225, IS QUITE ENTHUSIASTIC ABOUT DR. SUDING'S VIDEO GRAPHICS WORK BECAUSE OF THE POSSIBILITIES OFFERED FOR MICROCOMPUTER GAMES. (AND GAMES IS HIS GAME)

W.H. BURTNER, RR2 BOX 267, VALPARAISO IND 46383, HAS ADDED TWO 4K BOARDS OF 2102'S TO HIS MARK-8'S ORIGINAL 1K AND IS HAVING DECODING PROBLEMS (THE 1K SHOWS UP IN THE HIGHER ADDRESSES & INTERFERES WITH THE NEW MEMORY). IF ANYONE COULD OFFER A HELPING HAND IT WOULD BE APPRECIATED. HE IS ALSO CURRENTLY INVOLVED IN THE CONSTRUCTION OF AN ALTAIR 8800 AND JUST ORDERED A CREED TTY FROM BOB COOK.

PAUL E. FEICK, INTERMOUNTAIN COMPUTERIZED BUSINESS SYSTEMS, 1105 MALA DRIVE, LAYTON UTAH 84041, IS OWNER/MANAGER OF I.C.B.S. AND PLANS TO USE THE ALTAIR 8800 HE RECENTLY ORDERED TO CUT DOWN ON THE TELEPHONE AND CPU EXPENSES INCURRED BY HIS BUSINESS. HIS SYSTEM WILL EVENTUALLY HAVE THE TVT II, CASSETTE STORAGE, HS PRINTER AND USE BASIC AS THE PROGRAMMING LANGUAGE.

MORRIS KRIEGER, 37 EIGHTH AVENUE, BROOKLYN N.Y. 11217, WOULD LIKE TO SEE SOMETHING LIKE A HEATHKIT INSTRUCTION SHEET (WRITTEN IN LAYMEN'S LANGUAGE) FOR THE CONSTRUCTION OF A MARK-8 (AND ALSO SOMETHING TO CLEAR UP SOME OF THE TERMS WHICH ARE CONSTANTLY BEING THROWN HIS WAY). IF SOMEONE IN HIS AREA HAS A MARK-8 UP AND RUNNING (OR BUILDING) AND WOULD LIKE TO SHOW IT OFF, THERE'S A GOOD CHANCE THAT MR. KRIEGER WOULD APPRECIATE AN INVITATION TO COME OVER AND SEE IT.

RICHARD P. INZINA, 4415 WHITE ACRES RD., CLARENCE N.Y. 14031, IS STILL IN THE CONSTRUCTION STAGE WITH HIS MARK-8. HE JUST ORDERED A CREED TTY AND IS INTERESTED IN BUILDING A 5 LEVEL PT READER. THE MARCH 73 ISSUE OF 73 MAGAZINE HAS AN ARTICLE ON A 5 LEVEL READER WHICH USES A TD (TAPE DISTRIBUTOR). IF ANYONE KNOWS WHERE HE CAN GET A TD, PLS LET HIM KNOW. HE HAS HAD NO LUCK AT ALL IN GETTING A RESPONSE FROM PRECISION SYSTEMS REGARDING THEIR POWER SUPPLY.

JOHN W. CHOCHRAN, PO BOX 966, JESUP, GA 31545 HAS ORDERED SOME PARTS FOR THE MIL MOD-8080. HE ALSO SENT CLIPPINGS FROM "ELECTRONIC NEWS" ON MIL'S BANKRUPTCY AND THE TI MICROPROCESSOR PROGRAM ON TV STARTING APRIL 15.

TIM RAND, 59 WILLINGTON OACKS, STORRS, CT 06268 SAYS HE IS VERY EXCITED ABOUT EVERYTHINGS THAT IS GOING ON. IT SEEMS TO HIM THAT A WHOLE GANG OF COMPUTER HOBBYISTS SPRANG UP FROM NOWHERE. (NOW, HOW CAN WE CONVICE THOSE OLD TUBE TV MEN AT RADIO-ELECTRONICS AND POPULAR ELECTRONICS THAT THIS IS TRUE AND GET SOME CONTINUITY IN THEIR TECHNICAL AND PROJECT ARTICLES.) HE IS PUTTING OFF CONSTRUCTION FOR A WHILE. HE'S INTERESTED IN COMPUTER GAMES AND GRAPHICS AND WILL BUILD A POWERFUL DISPLAY PROCESSOR AND INTERFACE IT TO A MARK-8. HE WAS A PPOGRAMMER FOR 10 YEARS BUT IS NOW A DIGITAL DESIGN ENGINEER WORKING ON DATA GENERAL NOVA SYSTEMS.

DAVID F. STOUT, 717 SARANAC DRIVE, SUNNYVALE, CA 94087 (408)736-0846 HAS BUILT A TVT AND IS HALF FINISHED WITH A MARK-8. HE INTENDS TO EXPLORE THE POSSIBILITIES OF USING THE MARK-8 TO CONTROL AN ELECTRONIC MUSIC SYNTHESIZER.

GEORGE TATE, 3544 DANLIA AVE., LA, CA 90026 WAS UNHAPPY WITH MITS'S RESPONSE TO OUR REQURESTS FOR I/O INFORMATION AND IS WRITING THEM WITH HIS FEELINGS ON THE PROBLEM. HE HAS AN 8800 ORDERED WITH 4K OF MEMORY AND PARALLEL I/O PORT. HE SUGGESTS THAT A WAY OF COUNTERING THEIR RESPONSE IS BY ALL 8800 USERS EXCHANGING INFO ON OPTIONS THAT THEY BUY SO OTHERS CAN DUPLICATE THEM AT LOWER COST.

EDWARD C. EPP, SWAN LAKE CHRISTIAN CAMP, VIBORG, SD 57070 WILL START A MICROCOMPUTER PROJECT AS SOON AS HE CAN GET THE FINANCES FIGURED OUT. HE'S AN ELECTRONICS INSTRUCTOR AT FREEMAN JUNIOR COLLEGE AND PLANS TO USE HIS MACHINE FOR TEACHING IN HIS CLASSES.

DONALD K. ABELES, 7054-25TH N.E., SEATTLE, WA 98115 (206)525-7764 WROTE MITS STATING THAT DUE TO THEIR LACK OF COOPERATION WITH THE MICRO-8 USER GROUP, HE WAS CANCELING HIS $1000 ORDER. HE HAS A SCELBI-8H KIT THAT WORKED THE FIRST TIME HE TURNED IT ON. HE HAS ORDERED THE SCELBI TAPE AND TTY INTERFACE. (AFTER YOU SEE THE PDP-11/LSI YOU'LL BE MOST HAPPY YOU CANCELLED WITH MITS.)

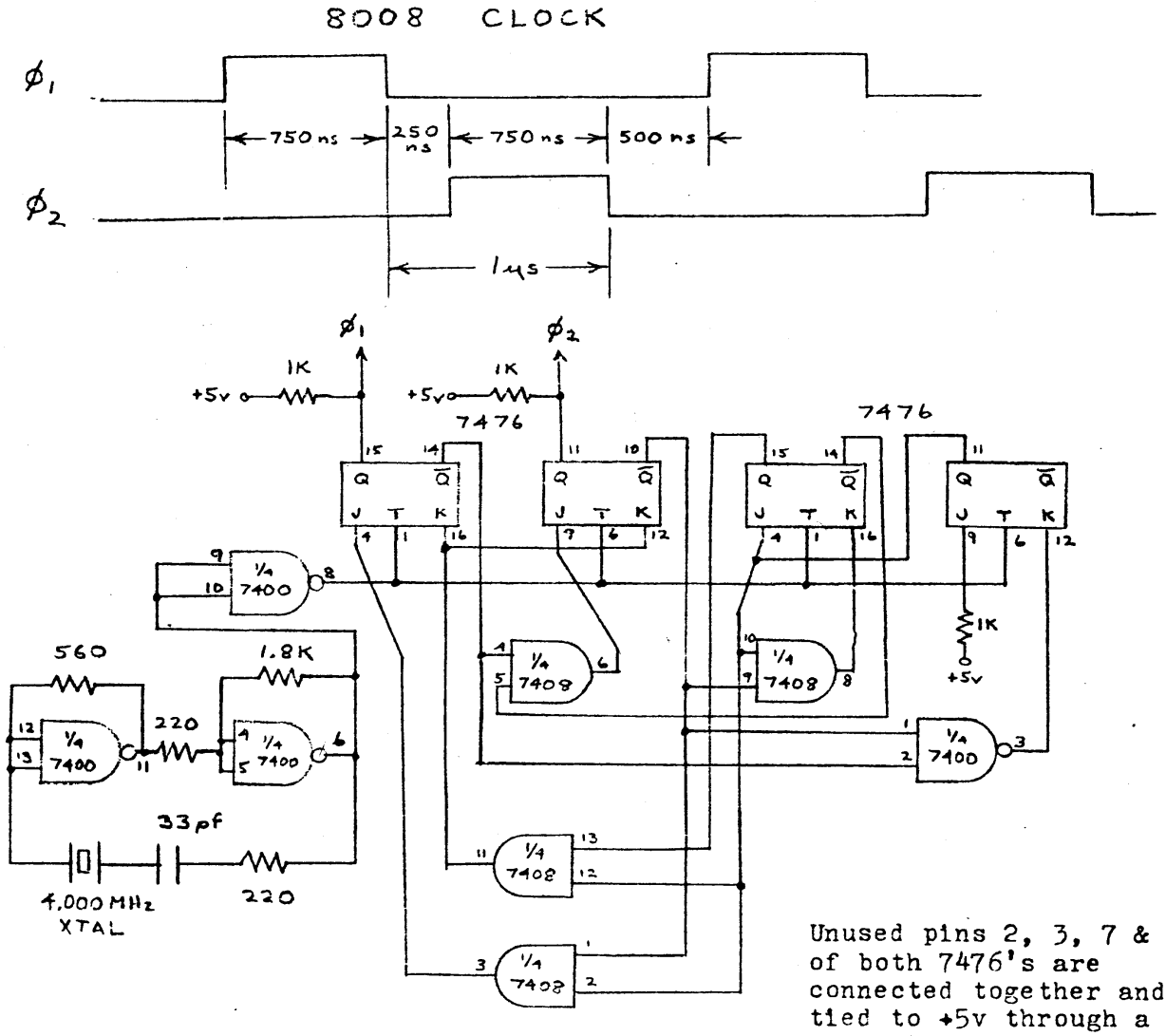
O.C. TASKER, PO BOX 168, ROMNEY, WV 26757 HAS COMPLETED HIS MARK-8 AND IS STARTING ON THE 7 INCH COMPUTER HOBBYIST GRAPHICS DISPLAY. HE HAS AN M-15 TTY AND M28 REPERF AND TD. FOR A POWER SUPPLY, HE USED FOUR 6 AMP-HOUR SURPLUS NI CAD CELLS AND AN UNFILTERED BATTERY CHARGER. THE -9 VOLTS WAS OBTAINED FROM A +5 TO -9 CONVERTER THAT WAS PART OF A SOLID STATE MEMORY SOLD BY ALTAJ. HE IS USING AN 8008-1 BUT IT WILL NOT RUN AT 800 KC. I SUGGESTED THAT HE USE THE BUS LOAD SWITCHING CIRCUIT IN THE INTEL MCS-8. ANY OTHER SUGGESTIONS?

JOHN W. NALL, PO BOX 1563, TALLAHASSEE, FL 32304 SUGGESTS DIFFERENT NL EDITORS FOR EACH OF THE FOLLOWING SPECIAL INTEREST GROUPS: 1) HAM RADIO ENTHUSIASTS. 2) SOFTWARE NUTS 3) HARDWARE NUTS 4) COMPUTER APPLICATIONS.

WILLIAM PARRISH, PARRISH SOLID STATE POWER SYSTEMS, 127 WINFIELD AVE., JERSEY CITY, NJ 07305 WANTS TO OFFER 5 VOLT 3 AMP POWER SUPPLIES FOR $75.--. HE OFFERS A SPECIFICATION MANUAL FOR $1.50 TO MICRO-8 PARTICIPANTS THE COST OF WHICH WOULD APPLY TO THE PURCHASE OF THE POWER SUPPLY. (THE MANUAL I RECEIVED CONTAINED NO CIRCUITS AND NO SPECIFICATIONS.) HE SAYS HE IS USING ALL BRAND NEW PARTS AND WILL SEND A COMPONENT LIST IF YOU WANT TO SEE WHY HE IS ASKING $75 FOR THIS UNIT.

HE SAYS ALL DC COMMONS FROM POWER SUPPLIES AND PC BOARDS SHOULD TERMINATE AT ONE POINT ONLY AND THAT THIS POINT SHOULD BE TIED TO EARTH GROUND TO MINIMIZE NOISE PROBLEMS. ALSO MAKE ALL GROUND WIRES AS HEAVY AS POSSIBLE.

WALTER M. WHITE, 343 S. MADISON AVE., 18, PASEDENA, CA 91101 WONDERS IF THERE IS ANY THOUGHT TO STARTING A SOFTWARE LIBRARY. (JOE CIMMINO HAS THE ONLY PLANS THAT WE KNOW ABOUT AND HE HASN'T FIRMED THINGS UP YET. IN THE MEANTIME, THE CABRILLO COMPUTER CENTER WILL ATTEMPT TO DISTRIBUTE SOFTWARE OF GENERAL INTEREST. WRITE DIRECTLY TO THE AUTHOR FOR SPECIAL ITEMS.) HE WARNS THAT THE MARK-8 CLOCK DOES NOT MEET INTEL'S MINIMUM PULSE WIDTH SPEC OF 700 NS FOR PHASE 1 AND 550 NS FOR PHASE 2. THE MARK-8 CLOCK IS ONLY 500 NS WIDE. HIS CIRCUIT BELOW MEETS SPECS BUT RESULTS IN A SLOWER CLOCK RATE OF 444 KHZ INSTEAD OF 500 KHZ. HE IS WORKING ON A COLOR, VARIABLE CHARACTER SIZE TVT WHICH IS HALF FINISHED. IT USES THE MOTOROLA MCM6571L UPPER & LOWER CASE CHARACTER GENERATOR AND WILL DISPLAY 32 LINES OF 64 CHARACTERS WITH VIDEO INJECTED DIRECTLY INTO THE VIDEO AMP OF THE TV. HE ALSO SUPPLIED A MEMORY CHECKING PROGRAM WHICH WE'LL SEND YOU COPIES OF FOR A SASE AND 30 CENTS IN STAMPS. IT CONTAINS A NEAT RANDOM NUMBER GENERATOR THAT MAY BE USEFUL IN OTHER PROGRAMS. WALTER IS PARTICULARLY INTERESTED IN A FLOATING POINT PACKAGE. CAN ANYBODY HELP HIM OUT?



Unused pins 2, 3, 7 & 8 of both 7476's are connected together and tied to +5v through a 1K resistor.

George Fischer, Staten Island, N.Y. received his Altair 8800 kit and had it 95% complete within two weeks. Regarding the Altair for the hobbyist, he is optimistic. First, it fills a need as an easy to assemble, attractively cased mini. Second, add-ons can come from the hobby environment as well as MITS.

George is also building M P Publishing's ECS 8008 system. This project requires a lot more effort but he expects to learn a lot more from it.

And, from John Craig.....

NEW ADDITIONS TO THE ROSTER

Jon Turner, 301 Ocean Ave. #8, Santa Monica CA 90402, would like some suggestions regarding the best kit to build. Mr. Farr?

D.A. Powell-Williams, 6023 S.E. Marine Drive, Burnaby B.C. Canada V3N 2X8

Don Hartley, Route 1, Box 329, Yorkville ILL 60560, sent us a photo of his completed Mark-8 and TVT (as of last Nov, even). He has a very sharp octal entry and display set-up (from Dec Pop Electronics) and plans to use his Mark-8 for weather research, graphics, and learning programming. He could use some help and pointers in basic programming techniques. (Just remember, Don, if you can't get started on a program....do a LOAD A, and take it from there!)

James E. Connaway, 639 Frederick St. S.W., Vienna VA 22180, and.....W4ESN. (NOTE: if you HAMS come up with a time and frequency we'll sure be glad to publish it.)

Daniel L. Pastell, 2904 Via De La Guerra, Palos Verdes Estates CA 90274.

Robert Baer, 921 Lincoln Ave., Palo Alto CA 94301

Brian Chesire --WA5PPO/L--, 113 E. Elberta #8, Atwater CA 95301

Robert G. Confrey, PSC Box 4636, Beale Air Force Base CA 95903

Beardsley Ruml II, 3306 Cathedral Ave. N.W., Washington D.C. 20008, is a lawyer interested in reducing the cost of legal services to middle and low income consumers thru the use of computers.

Steven A. Fischer, Box 337 SDSM&T, Surbec Center, Rapid City S.D. 57701, is in the process of purchasing "a computer based on INTEL's 8080." (Would that be an Altair 8800, Steve?)

John Angus, 97-30 135 RD., Ozone Park L.I. 11417 (That "L.I." stands for Long Island, I think. But, I bet the Post Office would prefer N.Y.) Anyway, welcome aboard, John.

Robert E. Smallwood, 20-12 St. N.W., Calgary Alberta Canada, T2N 1Y3, says that C&C Specialists, P.O. Box 7847, Stanford CA 94307, owes him $10. Has anyone else had dealings with this company?

Thomas J. Young, 327 Duxbury Rd., Silver Spring MD 20904, is in the process of building his Mark-8.

H.N. Campbell, R.D. 3 - Brockway Road, Moravia N.Y. 13118, finished his Mark-8 about three months ago and has been troubleshooting it ever since trying to get it up and running. He wouldn't object to an offer of help from anyone in the area.

Oh, and here is a good one!! Tom Boyko, Varian Data Machines, 12062 Valley View, Suite 204, Garden Grove CA 92645. Tom is a Customer Engineer with Varian and I had him as a student in a disc class several weeks ago. (As a matter of fact, he was the only student!) We probably spent 60% of our time discussing the Mark-8 and 40% discussing the Diablo Disc. He got so fired up about this thing that he went home and started on a wire-wrap version and had 256 words of memory ready to go within 24 hours. (& he's sharp, so watch out for him!)

John Bird, Assoc. Professor, Community College of Baltimore, 2901 Liberty Heights Ave., Baltimore MD 21215

Michael A. Carlisle, 25 Twain Ave., Berkeley CA 94708

Bob Anders, P.O. Box 2063, Davidson N.C. 28036, is a senior chemistry major and has built his Mark-8 for an independent study project in on-line control of chemical instrumentation. He expressed his gratitude for the de-bugging tips in previous newsletters and reports that James Electronics provided him with speedy service and reliable components. He is, of course, interested in A/D and D/A interfaces.

Charles Musitano, Boeing, 4 Valley View Drive, Goddard Kansas 67052, is (I believe) either building an 8080 or is interested in it. (Actually, if he's building it....that would mean he's also interested in it!)

Jerry M. Newcomb, 825 Pacific Terrace, Klamath Falls OR 97601

Bob Pearce, 28 Hakim Street, Danbury Conn. 06810, recently bought the Mark-8 PC boards from M&R Enterprises and they recommended he contact us before he started construction. I like that.

Bill Seward, Dept. of Physics, Pomona College, Claremont, California 97111

Bob Wallace, P.O. Box 5415, Seattle, Washington 98105

Mark Yoseloff, Dept. of Math, Arizona State University, Tempe, Arizona 85281

We got hold of a copy of the AMATEUR COMPUTER SOCIETY NEWSLETTER put out by Stephen B. Gray, Amateur Computer Society, 260 Noroton Ave., Darien Conn. 06820. If you're interested, the subscription cost is $5 and the NL is published every two or three months. (subscription and membership for $5)

Dan L Kniesner, Librarian, Ohio Institute of Technology, 1350 Alum Creek Dr., Columbus Ohio 43209

Robert J. Elliott, Electronics Instructor, Miramonte High School, Acalanes Union High School District, 750 Moraga Hwy., Orinda CA 94563, is currently building a Mark-8 for classroom use. He's resurrecting a Kleinschmidt printer for output and plans to have a CRT display, paper tape system, & mag tape. And...a card reader system.

DeWalter Ekstrand, P.O. Box 1260 D, Southgate CA 90280

L. Dabrowski, 1815 N. Karlov Ave., Chicago ILL 60639

Mark Baker, 6113 Calle Tuberia, Scottsdale ARIZ 85251 is "in the process of building a microcomputer." Und vot kind of machine you building, Mark? Und vot you going do vid it?

Lonnie G. Clifton, Electronics Instructor, Indiana Vocational Technical College, 3501 First St., Evansville IND 47710, states that his school has a Scelbi System with an ASR-33. He would like very much to hear from other educators using minicomputers as an educational tool. (e.g., problems encountered, CAI, curriculum, special programs, etc.)

Steven Dompier, 2136 Essex St., Berkeley CA 94705, is currently building the Altair 8800 with disc capabilities.

Maynard M. Dye, Net Worth Programming, 4986 San Joaquin Drive, San Diego CA 92109

Antonio Grante, Spevack Surgical Supply, Inc., 1345 Nostrand Ave., Brooklyn N.Y. 11226

Dennis Griessner, P.O. Box 1743, Cullowhee N.C. 28723, is a high school student who recently finished the TV Typewriter and is currently working on a tape reader. He plans to build a microcomputer in the future but right now "money is a problem." Welcome to the club, Dennis.

Douglas Hogg, 2516 Castillo (rear cottage), Santa Barbara CA 93105

Richard P. Inzina, 4415 White Acres Rd., Clarence N.Y. 14031, is currently building a Mark-8 and eventually plans to interface it with a TVT, cassette, and some sort of hard copy device.

Microcomputer Techniques, 11227 Handlebar Road, Reston VA 22091. (Ah din' git no name on thet one!)

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Oops! Almost forgot! One final note before I depart..... Mr. Wayne Davies in Mission Viejo California got his Mark-8 up and running at 2 A.M. Sunday morning, February 9th.

ARTHUR NOGUEROLA, 05 OLD FARM RD., VALHALLA, NY 10595, IS A RESEARCH ASSISTANT AND PROGRRAMMER AT HUNTER COLLEGE (NYC). HE IS WORKING IN THE CHEMISTRY DEPT. WHERE THEY ARE USING THE 8008 TO COLLECT DIGITIZED SPECTRA WHICH THEN GO THRU A UART TO A NOVA COMPUTER FOR PROCESSING.

FRED MOORE, 2100 SANTA CRUZ AVE., MENLO PARK, CA 94025 IS PUBLISHING THE BAY AREA COMPUTER GROUP'S NEWSLETTER.

NEIL A. BENSON, 10040 NICOLLET, BLOOMINGTON MN 55420, HEARD ABOUT US FROM THE "COMPUTER HOBBYIST" AND HAS ABOUT 3/4 OF THE GOODIES FOR HIS MARK-8.

WALTER J. KLOS, 5193 S. ETNA ST., KLAMATH FALLS OR 97601

GARY ALEVY, EMORY UNIVERSITY, BOX 21393, ATLANTA GA 30322, IS INTERESTED IN BUILDING A MARK-8.

MARTIN NICHOLS, 100 GUY ST., DOVER, NJ 07801, HAS THE UNIQUE DISTINCTION OF BEING A PERSON WE INADVERTANTLY IGNORED. IT'S POSSIBLE WE SIMPLY LOST YOUR FIRST CORRESPONENCE, MARTIN, (OR THE US POSTAL SERVICE DID) BUT IN ANY CASE WE APOLOGIZE. MARTIN HAS BEEN INVOLVED FOR THE PAST TEN YEARS IN SOFTWARE DEVELOPMENT FOR LARGE SCALE MACHINES AND IS CURRENTLY BUILDING A MARK-8.

TED SALLUME, 945 VIA FARGO, SANTA MARIA, CA 93436 IS THE PERSON RESPONSIBLE FOR GETTING THE LOMPC-SANTA MARIA-SANTA BARBARA LOCAL GROUP GOING.

HOWARD P. DODGE, THE CHOATE SCHOOL, WALLINGFORD, CN 06492 HEARD ABOUT US THRU THE "PEOPLE'S COMPUTER COMPANY."

JOHN CHRISTENSON, 439-16TH AVE. NO., SOUTH ST. PAUL, MN 55075 IS INTERESTED IN BUILDING THE MARK-8 AND THE TVT.

EDWIN L. MORGAN JR., 314 VINE ST., CHILLICOTHE, OH 45601, ALSO HEARD ABOUT US THRU PCC AND WOULD LIKE TO FIND OUT MORE ABOUT THE MARK-8. WELL, ED, IT ALL STARTED IN THE JULY 1974 ISSUE OF RADIO-ELECTRONICS MAGAZINE.

BRUCE HARRIS, 1532 N. LAFAYETTE, CLAREMONT, CA 91711.

TOM GRAHAM, 5107 ALAN AVE., SAN JOSE, CA 95124 HAS AN 8008 AND IS READY TO START A MARK-8.

CRAIG K. HARRIS, COORDINATOR, CLONLARA, 1289 JEWETT ST., ANN ARBOR, MI 48104 (313)769-4511 WORKS AT A SEVEN YEAR OLD FREE SCHOOL THAT WAS GIVEN A HAZELTINE TERMINAL AND PRINTER. THEIR GRANT FOR COMPUTER TIME RAN OUT AND THEY ARE LOOKING FOR ALTERNATIVES. THEY ARE LOOKING FOR LEADS ON ORGANIZATIONS THAT MIGHT BE INTERESTED IN FUNDING EXPERIMENTAL OR DEVELOPMENTAL PROJECTS FOR EARLY ELEMENTARY STUDENTS.

INFORMATION FROM SUPPLIERS

DR. MICHAEL HAYES, MNH APPLIED ELECTRONICS, WAS RECENTLY TRANSFERRED BY THE MILITARY SO THE NEW ADDRESS FOR HIS COMPANY IS PO BOX 367, JAMUL, CA 92035 AFTER APRIL 15. HE WARNS THAT THERE MAY BE SOME DELAY TO CUSTOMERS IN THE MOVE BUT THEY WILL TRY TO KEEP THINGS RUNNING SMOOTHLY. HIS MODEMS ARE SELLING WELL. CURRENT PRICES ARE $35 FOR MODEM ALONE, $5 FOR DOCUMENTATION, $5 FOR CABLES, AND $5 FOR POSTAGE AND HANDLING. JOE CIMMINO SENT A DRAWING ON WIRING THEM UP FOR USE IN A CASSETTE MODEM SYSTEM. (SEND A SASE AND A COUPLE OF STAMPS IF YOU NEED A COPY.) MIKE HAS FINISHED HIS MARK-8 AND IS INTERFACING IT TO A DIGITAL CASSETTE UNIT MADE BY MFE CORP., SALEM, NH. HE SAYS BILL ALLEN, SURPLUS ELECTRONIC, NTD INC., 9600 BALTIMORE BLVD., COLLEGE PARK, MD HAS NICE METAL CASES AND POWER SUPPLIES PERFECT FOR THE MARK-8.

MAURY GOLDBERG, MINI MICRO MART, 1618 JAMES STREET, SYRACUSE, NY 13203 (315) 422-4467 SAYS THE MIL BANKRUPTCY THING WAS A REAL BLOW. IT WON'T AFFECT THE MOD-8, BUT IT WILL SLOW DOWN THE 8080 VERSION. HE HOPES TO GET A FEW MONITOR-8 ROM'S. SEND A SASE FOR INFO ON WHEN AND WHAT THEY WILL COST. HE PROMISES US A NEWSLETTER ARTICLE ON THE MIL DEMISE AND ITS EFFECTS FOR THE NEXT NL. HE WILL HAVE A KIT FOR THE SUDING SCIENTIFIC CALCULATOR COMPLETE WITH PC BOARD AND ALL IC'S, SOFTWARE, ETC. FOR $69.95 UNTIL THE FIRST 25 KITS ARE GONE, $74.95 THEREAFTER. THE FIRST 25 WILL BE DELIVERED BY LATE APRIL. HE IS SELLING OFF 2000 2102'S @ $3.95 PLUS $2.00 HANDLING AND SHIPPING DURING APRIL ONLY. HE SHOULD BE ABLE TO SUPPLY MIL MOD-8 CASSETTE INTERFACES SOON. HIS MAGAZINE AD HAS KEPT HIM ON THE PHONE ALMOST CONTINUALLY. DUE TO AN UNEXPECTED HANGUP, THEY CAN NOT ACCEPT BANK AMERICARD OR MASTERCHARGE CARDS.

MARTY SPERGLE, M&P ENTERPRISES, PO BOX 1011, SUNNYVALE, CA 94088 HAS THE FOLLOWING DEAL ON 2102-1'S. (YOU GUYS WITH THE 8080'S BETTER WATCH WHAT YOU BUY OR YOU'LL END UP HAVING TO WAIT YOUR PROCESSOR ON THE MEMORIES. THESE ARE FAST ENOUGH. MOST OTHERS AREN'T.) PRICES ARE $4.50 EACH, 8 FOR $35, 16 FOR $68, 32 FOR $130, AND 64 FOR $250. HE HAS SOME 8008-1 (THE FAST ONE) FOR $50.00.

JAMES E. HEIL, OWNER, ELECTRONIC DISCOUNT SALES, 138 N. 81ST ST., MESA, AZ 85207 AGREES WITH COMMENTS REGARDING MITS AND POP ELECTRONICS IN NL #5. HE DOSEN'T APPRECIATE THEM DISGUISING COMMERCIAL ADVERTISEMENTS IN THE FORM OF HOBBY CONSTRUCTION ARTICLES. HE NOTES THAT THE BROCHURE ADVERTISING THE ALTAIR 8800 "USER GROUP" IS EVEN LESS HEAVILY DISGUISED, CRASS ADVERTISING. HE IS STILL SELLING MF8008'S FOR $50 AND 8080'S FOR $175. WRITE FOR CATALOG #6 WHICH IS 7 PAGES AND CONTAINS MANY EXCELLENT BUYS ON HARD TO GET COMPONENTS.

JOHN R. BURGOON JR., SOLID STATE MUSIC, 1222 CAROLYN DRIVE, SANTA CLARA, CA 95050 296-7330 HAS THE FOLLOWING AVAILABLE:
4K MEMORY BOARD $163.80 PLATED THRU HOLES, BLUE, ALL 2102'S (32) 8008 SPEC SPEED, SOCKETS, CAPS, EDGE CONNECTOR, 2 7442, 2 7404, 1 7400 BOARD IS SET UP FOR MARK-8 BUS.
2102/2602'S - 8/$32 1101/2501'S - 8/$8.-- BOTH MARK-8 TESTED.
1702 EROM'S - $18.-- (CHECK TO SEE IF THESE ARE A'S)
8223 PROM'S - $3.50
7489/8225 RAMS - $1.85 8263 MUC - $4.00 8288 DIVIDE/12 - $1.00
BARE 4K 2102 BOARD - $17.00 1103 - $1.50
8008'S - MARK-8 TESTED - $44.00

PARTICPANTS CAN'T SEEM TO SAY ENOUGH KIND WORDS ABOUT JAMES ELECTRONICS. DAVE DUSKIN IN LOMPOC HAS PLACED MANY ORDERS WITH HIM AND THE LONGEST TIME IT HAS TAKEN TO RECEIVE PARTS IS 4 DAYS FROM TIME OF MAILING TO RECEIPT OF THE COMPONENTS. FAILURE RATE HAS BEEN LOW AND REPLACEMENT OF THOSE FEW COMPONENTS FOUND TO BE BAD IS FAST.

MICRO-8 NEWSLETTER SUBSCRIPTION FORM

_____
I I PLEASE SEND NEWSLETTERS NO 6 THRU 11 ENCLOSED IS A CHECK
_____ FOR $6.00 MADE OUT TO THE CABRILLO HIGH SCHOOL COMPUTER CENTER.

_____
I I PLEASE SEND NEWSLETTERS NO 1 THRU 5 OFFSET PRINTED. ENCLOSED
_____ IS A CHECK FOR $3.50 MADE OUT TO THE CABRILLO HIGH SCHOOL COMPUTER CENTER. (IT MAY BE SEVERAL WEEKS BEFORE THEY ARE RECEIVED FROM THE PRINTER)

NAME _____

ADDRESS _____ TELEPHONE # _____

_____ (IF YOU DON'T MIND BEING CALLED BY OTHER PARTI- CIPANTS)

_____

ZIP

WILCOX ENTERPRISES
25 W 178 - 39TH ST.
NAPERVILLE, ILL. 60540

312-357-3021

NEW ITEMS AND NEW PRICES

8008 - 8 bit Microcomputer chip		$45
	with Creed	$40
1702A - 256 x 8 Programmable and erasable ROM		$30
(Programmed with Creed Monitor free)	with Creed	$25
2102-2 1K x 1 RAM Static		$4.50
	8 or more	$4.25
	32 or more	$4.00
74LS138 Deooders (1 out of 8)		$2.25
25 pin connectors (male or female)		$1.00
Plastic case for above		$1.00
8 conductor cable, 2 are heavy power leads		$.10 per foot
50 feet of above with 25 pin male connectors and plastic cases on each end (2 1/2 lb)		$6.00
Teletype modle 28 KSR, printer and keyboard, table model with table - heavy duty 5 bit machine, 10 years old		$250.00
IBM 054 punched card verifier(can be used to read cards under control of 8008)		$150.00
731 Selectric I/O typewriter - like new -		$800.00
IBM 2740 terminal with I/O Selectric and control electronics		$1800.00
Dura Mach 10 with I/O Selectric, 8 level punch and 8 level reader and electronics		$1000.00
Flexowriter with tape reader and punch		$250.00
Rixon Speed Conversion module with connector to plug into, manual and instructions to use to convert TTY signal speed. This is a beautiful piece of commercial equipment.		$9.50
Other Rixon circuit packs:clocks, modems, multiplexers, powersupplies - write for list.		

Weights: Creed - 55 lb, Creed shipping crate - 9 lb, transformer - 4 1/2 lb, Interface kit and packing for Creed - 5 1/2 lb, box of 10 paper tape reels - 9 3/4 lb, power box - 4 3/4 lb, tape winder and reels 4 3/4 lb.

Shipping: FOB Naperville. Will be sent Greyhound COD for shipping charges for large items unless you specify otherwise. Greyhound seems to be the best and cheapest. The Creed is too heavy for parcel post or UPS. REA is another alternative, but is more expensive. It is possible to pack a tape winder with the Creed in its crate or up to 14 reels of tape. Other items will be packaged separately.

The Creed manual grew to 26 pages and is finally ready to go. We are currently investigating a power supply for an entire 8008 system using the power transformer included with the Creed interface and an 8008 system built on one of the wire wrap boards we advertise at $10.

A lot of interest has been generated in the MIL monitor on one 2K word chip, however recent events have cast some doubt on when and if it will be available in this form. We are also investigating the possibility of offering the MIL monitor or an improved version of it on 1702's or possibly having our own 2K chip made up. In order to have our own 2K chip made we would have to have a good number of people willing to subscribe ahead of time and put down a deposit on it. In the meantime I would suggest that you use the Creed monitor on 1 or 2 1702's since they can be easily reprogrammed later and the Creed monitor will give you the basics to get you going.

Micro-8 Computer User Group Newsletter
Hal Singer & John Craig - Editors
Cabrillo Computer Center
4350 Constellation Road
Lompoc, CA 93436

May 20, 1975
Volume 1, Number 7

Phone (805) 733-3501 (1:40-4:30 PST)
(805) 735-1596 (evenings)

We finally got another issue of the MICRO-8 Newsletter thru the printer and mailed out. Hope your impressed. Note: 72 pages! Subscriptions have made it economically possible to print and mail out this size newsletter. At the rate subscriptions are coming in, future NL's can be this big if we receive enough camera ready material.

A good many participants have running 8008 and 8080 computers and are concerned with trying to make them do something. An effort was made to try to make this issue "heavy" on software. The only way you can get good at programming is to read code so even if you aren't interested in all of these programs, figuring out the code will make it easier to write your own programs.

Printing Format

One wouldn't think that page arrangement would be a big problem in preparing a newsletter but it is. Printing is expensive and first class postage "eats you alive" and is necessary because 3rd class is unreasonably slow in most cases so some kind of reduced format is necessary if a lot of material is to be included. By printing sideways on $8\frac{1}{2}$ x 11 pages, four sheets can be printed per page with only a 2/3 type reduction making it acceptable for reading (although it doesn't do anything for the printing quality when using marginally acceptable camera ready copy).

These sheets can be folded into a booklet as in NL# 5 which is nice except we keep getting complaints that they cannot be punched and placed in 3 hole notebooks. Along comes Eric Schott, 208 14th Ave., Juanita, Altoona, PA 16601 to the rescue. He sent in some sample booklets showing possible printing formats. His unreduced format wasn't acceptable because getting twice as much material printed at only a 2/3 type size reduction is too good a deal to turn down.

His reduced format seemed ideal. It's main feature was that the pages could be placed in a 3 ring notebook and when turned sideways, 4 full pages were arranged in front of you allowing easy page-to-page reference and two-page schematics where necessary. Computer hobbyists are obviously clever guys at getting electronic stuff working but they are sure slow at figuring this format out. All copies are being sent out prepunched to make it a little easier to figure out. Eric and I are sold on this format so you are going to get it whether you like it or not. Try it, you'll like it!

What Is A Newsletter?

There seems to be a little confusion as to what we are trying to do. This is a newsletter service, not a magazine. Our intention is to reprint and distribute material sent in by participants that you might be interested in and get it into your hands as fast as possible with the names and addresses of the contributors so you can contact them if you want more information. Also names, addresses and telephone numbers of participants are included to encourage communication and formation of local groups. Most of the material that comes in is a randomly organized letter containing a whole bunch of items. It is a non-trivial

task to extract and condense this material and include it with the participants name and address. So far, I think we have done pretty well, and we'll continue to try to do the same.

We receive occasionalàl complaints about lack of subject titles and grouping. I think the important title is the submitter's name, address and telephone number. An excellent project for some participant would be a subject matter index. I'd rather spend my time extracting and condensing more material from participant's letters.

John Craig and I have vowed that we will not be the ones that let the newsletter die as long as there is a need to disseminate information. As long as you will send in material, we will continue to try to get it out to you in as readable form as possible. You can help tremendously by submitting material typed with a fairly new "black" typewriter ribbon, schematics drawn with a black flow tip pen, and sharp clear Xerox copies. As soon as material submitted drops off, there will no longer be a need for the NL service and we will cease publishing and return unused funds.

Regarding MITS and 8080 Systems

In NL's 5 and 6, some harsh comments from participants and the editors regarding MITS's sales policies have been interpreted by some as disinterest in 8080 systems (ALTAIR 8800). Nothing could be farther from the truth. At this time, one should seriously consider whether starting an 8008 system that is not easily expandable to an 8080 is a wise move. Most of us started with 8008's and the information is heavily directed that way. Remember though, all programs and interfaces for an 8008 can easily be modified for 8080's but it doesn't work quite so well the other way around. Letters coming in in response to the PE mention confirm that there are an enormous number of ALTAIR 8800 owners desperate for memory expansion and peripheral interface information as well as software. Please contribute any technical information or programs you have for 8080 systems.

Popular Electronics Mention in Computer Notes Column

You probably noticed that Jerry Ogden printed an excerpt from a 5 month old letter in his Computer Notes column in the June PE. When that letter was written, we were still doing spirit master duplication and offered to supply NL's 1-4 to prospective ALTAIR 8800 builders for a 50¢ SASE. Since PE did publish the 5 month old offer, we feel we must honor our agreement so NL's 1-4 are being sent out. The June issue has only been out for two weeks and over 250 requests have been received.

To remain fair to the participants that ordered the printed back issues at $3.50, the fee schedule for these new participants is: NL's 1-4 50¢ SASE, NL's 5 & 6 $3.00, NL's 7-12 $6.00. All participants that renewed for $6.00 will receive issues 7-12.

Flash Announcements

The 1st meeting of the Amateur Computer Society of New Jersey will be held Friday, June 13, 1975 from 7:00 to 10:00 pm at the Union County Technical Institute, 1776 Raritan Road, Scotch Plains, NJ. Contact Sol Libes at 889-2000 Ext. 282 or 291 days or 277-2063 evenings.

See the announcement inside on the LA Area meeting June 15.

8080 boards are now available for the Mod-8 system from Space Circuits. Thanks to Cabell A. Pearse, 3523 Tilden St. NW, Wash. DC 20008 for this information.

A System For The Novice Computer Hobbyist

I'm reluctant to recommend anything because the smallest hint of endorsement is interpreted by some as unconditional recommendation. However we do have some very novice participants that want to get into hobby computer construction without getting in over their head. Everything that I have been able to find out indicates that the Martin Research MIKE-2 system (see the 6 page ad later in the newsletter) is the one for them. It's reasonably priced, very well designed, and supported by a reliable company. Contact Mark Condic, 410 Woods Lane, Apt. 6A, Downer's Grove, IL 60515 or Martin Research for additional information. Mark's college class built up 14 of these systems and they were very favorably impressed. Be cautious on ordering boards only because the IC's to stuff them are the very latest releases and a little difficult to find.

Miscellaneous Comments On 8008's and 8080's

IC Electronic Supply, 15723 Roscoe Blvd., Van Nuys, CA 91406 (213)894-0171 or 619 W. Katella Ave., Orange, CA 92667 has 8008's for $24.95. 8080's are being sold in the L.A. area for $110 but I'm not sure where yet. Rumor has it that the TI 8080 will sell off the shelf at $100.

Intel has announced their 8080-A and all future deliveries will be that part. It differs from the regular 8080 by having full TTL drive capability, improved synch handling, and ability to jam in multi-byte instructions. It was probably introduced to complicate the lives of the second source suppliers. It will work in the same socket as the regular 8080.

Mr. Bill Roberts of MITS clarified the question of what kind of 8080's they are using in ALTAIR 8800's. It seems that Intel was a little upset when MITS was selling a board set including the 8080 for $294 at the same time they were trying to sell 8080's at $350 in single quantity. Those shipped to MITS were given a 8080-8 marking but were otherwise identical. When the fallout rumor started, MITS started accepting and shipping only those with the regular marking.

Intel will produce the 8008 companion chip that contains all the multiplex logic in the Fall and said that pricing of the pair will make it very cost effective compared to the 8080 so maybe the 8008 is not dead yet.

Programming Manuals For The Beginner

Nat Wadsworth of Scelbi Computer Consulting, 1322 Rear, Boston Post Road, Milford, CN 06460 has done it again. His first programming manual was higly recommended. Now he has written "Machine Language Programming For The 8008 (And other similar microcomputers)". You just can't believe the rave revues that keep coming in. It is an absolute must for your bookshelf. Coverage includes: 8008 instructions, flow charting, mapping, editing and assembling, debugging tips, fund. prog. techniques, loops, counters, pointers, masks, organizing tables, search and sort routines, math operations, muliple prec. arith., a floating point package, i/o programming, real time programming, programming for proms, etc. Its available for $19.95 book rate or $22.95 first class. The floating point package is worth that.

MIL Mod-8 Documentation Package

Anyone interested in or actually building the MIL Mod-8 computer system will want to order the $10.00 documentation package being offered by Robert Swartz, 195 Ivy Lane, Highland Park, IL 60035 472-6660 days and 432-6423 evenings, has prepared. Robert is our Mod-8 expert with his own unit having operated perfectly for the last few months. He has debugged another unit and is thoroughly familiar with the system, errors in the PC boards, and the available documentation. The package will include:

1) The MF8008 Data Book containing Mod-8 circuits, foil diagrams and Monitor-8 listings (these are scarce as hen's teeth because MIL ordered them all destroyed) as long as the supply lasts.
2) Mod 8-8 Prom Programmer documentation including circuity, parts list, and component placement.
3) Audio cassette/Mod-8 interface documentation.
4) Notes on the MOD-8 system inluding manual errors and parts lists.
5) Mod-8 self-test programs (getting this system up isn't trivial since not front panel is available)
6) Notes on I/O Port expansion
7) Hints on getting the system running.

I've seen Robert's package and no way are you going to get a Mod-8 up and running without it. (At the present time the only known source of the MF8008 book is duplicating it and selling it for $5.00)

Scope Graphics Terminal

Carl Hellmers of MP Publishing Co., Box 378, Belmont, MA 02178 has a Digital Graphics Oscilloscope Display interface by James Hogenson in Vol 1, #5, that will really turn you on. It drives any cheapie Heathkit or Eico oscilloscope, uses 4 2102's to store a raster of 64 x 64 dots that can be either on or off. Graphics game programs using 8008's or 8080's should be a cinch with this interface. Double sided plated thru PC boards are available at $25 from MP Publishing. We have a copy of the article in our literature loan file to send out on short term loan if you are not an MP Publishing subscriber. You may become one after you get a close look at this interface.

Information Regarding Suppliers

Let us repeat! When you send off a check to a supplier, kiss it goodby, because you may never see that money again. What's almost as bad is if the check gets cashed and you wait months for delivery on items you need now. If a guy's advertising looks too good to be true, it probably is. If it looks like he is offering too many hard to get items, beware. If he can supply them, other people could also, and they wouldn't be hard to get. If the prices are much lower than other outfits, he's probably selling junk and its hard enough to get these complicated computer systems running without having to find defective parts as well. What do you do when a guy offers something you have to have and he is the only one that offers it? I don't know. But you'd better clarify everything by telephone and or letter before you send your money.

If they accept Mastercharge or BankAmericards, you've got several things in your favor. At least some bank recognizes them and part of the agreement they sign is that they will submit information on when and how items were shipped. If you don't get them, you just stop payment on the bill at your bank.

William E. Shawcross, 1105 Massachusetts Avenue, Cambridge, MA 02138 (617) 547-7652 is managing editor of "Sky And Telescope" Magazine with a background in physics and astronomy. He took the Control Data Institute course in computer programming and done work with a CDC 3150 and a tape-oriented Honeywell-200 (tape oriented). He purchased a 256 word ALTAIR 8800 that ran the first time he turned it on after a week of spare time construction. He has a SWTP TVT-II with all the bells and whistles on order is looking forward to putting it together. He'll add more memory and a Suding cassette and should have a system that will keep him amused and occupied as well as helping him with commercial programming--mailing lists and files. He supplied the following program that is a 14 byte program to zero memory, starting just below the program and progressing down to zero and then repeating the whole business until stopped. It is listed here with octal 377 as the high address.

8080 Program To Zero Memory

Address (octal)			Instruction	Purpose
362	001	LXI	00 000 001	Load B&C registers with
363	362		11 110 010	starting address plus 1
364	000		00 000 000	
365	257	XRA	10 101 111	Zero accumulator
366	013	DCX	00 001 011	Decrement B&C registers
367	002	STAX	00 000 010	Store acc. in address in B&C
370	200	ADD	10 000 000	Effectively put B in accum.
371	261	ORA	10 110 001	Logical OR accum. with C
372	312	JZ	11 001 010	Jump to beginning if
373	362		11 110 010	zero (preceding 2 steps check
374	000		00 000 000	to see if address has reached 0)
375	303	JMP	11 000 011	If not zero, return to XRA
376	365		11 110 101	instruction
377	000		00 000 000	

Sincerely yours,

William Shawcross

R. E. SMALLWOOD, 20-12 ST. N.W., CALGARY ALBERTA, CANADA T2N 1Y3 SENT IN A BROCHURE ON THE PHI-DECK CASSETTE UNIT, SOME VERY INTERESTING CLIPPINGS ON THE MIL THING (SEEMS THE CANADIAN GOVERTMENT GOT TAKEN PRETTY BADLY), AND INFORMATION ON A MOTOROLA 6800 MICROPROCESSOR EVALUATION KIT CONSISTING OF 1 MC6800L (MPU), 2 MCM6810L1 (ROM), 1 MC6850L (ACIA) AND EXTENSIVE DOCUMENTATION FOR $300.00. THIS SHOULD BE AVAILABLE THRU ANY MOTOROLA DISTRIBUTOR HERE. HE SAYS THAT HE HAS HAD HIS DOUBTS ABOUT THE ALTAIR 8800 SINCE RECEIVING THE DATA PACKAGE WITH POOR QUALITY LAYOUTS, NO INFORMATION AND LOTS OF ADVERTISING LITERATURE. HE THINKS THE MAGAZINES HAVE BECOME COME-ONS FOR KIT MANUFACTURERS IN AN EFFOR TO PRESENT COMPLEX PROJECTS AND THE ALTAIR 8800 IS THE MOST BLATANT EXAMPLE.

Angel Bravo, 10333 Felson Street, Bellflower, CA 90706 announces that his computer, nicknamed the FRUSTRATION-8 is now running perfectly. He has had some very frustrating experiences. First he gambled and lost with the Electronic Component Sales swindle. He had something wrong with his original MF8008 which Marty Spergle of M and R replaced. He had to dig out some bad IC's with the help of Paul Farr. He can now see that a standardization scheme will have rough going, but hopes we can arrive at some standard, however limited it may be. At present he is learning toward Dr. Suding's approach, that is the TVT, cassette, calculator, and maybe Bob Cook's Baudot TTY. He says each one of us is going to have to set his own goals and not try to shoot for the moon, especially with the cross fire we find ourselves in with announcement of the LSI-11, PACE, M6800, MITS, etc.

Peter Wolfe, 4209 Highland Drive, Yarrow, BC Canada V0X 2A0 decided there was no difference in cost between the $397 ALTAIR 8800 and the MARK-8 after he got thru paying duty. He has ordered the 8800 and a SWTP keyboard. He appreciates Jim Fry's 2102 group buying effort. He hopes that we will soon agree on a cassette standard so he can decide which one to buy. (Maybe you'll have to settle for one of each, there cheap.) He is also trying to decide what kind of output device to use and is presently impressed with TVT-II.

Kendall Stambaugh, 5009 Guide Meridian, Bellingham, WA 98225 734-9424 has offered to redraw schematic diagrams for us. Thanks Ken, we'll get some to you soon.

Richard A. Peterson, 9004 184th Avenue E, Sumner, WA 98390 appreciates the information in the NL and says we do need a central clearing house for the start of this giant new hobby effort. It takes time and money to have a good organization and there is no way this thing can be sustained by depending solely on donated time. Popular Electronics is a joke (seems like a front for MITS), so all we have is Radio-Electronics (I'm not so sure they aren't a joke also) and the efforts of the various newsletter and publishing groups.

Joe D. Ringland, po Box 4784, Rolling Bay, Wa 98061 has constructed an ALTAIR 8800 and is awaiting a keyboard from Mini Micro Mart and a TVT-2 from SWTP. He has had great success translating 8008 programs to 8080 format. The only adjustment that need to be made are in timing loops and it would help if people would specify the time for their loops. Both 8080 and 8008 people would be helped since people use different clock frequencies and memory cycle times.

Gary L. Dickman, 707 Elm Street, Hays, KS 67601 is building a Mark-8 and will use a 4k 2102 board for memory. He is extending the input and output ports and is redesigning the LED Output register board to accept 7-segement readouts. He will soon have a PC layout ready for a double sided board but can't find anyone to etch a double sided board. Any suggestions? These layouts and/or boards are available to any user group participant. He will add the Suding cassette interface, Suding TVT, and Suding calculator and is contemplating a computer controlled cassette deck or a floppy disk for the future and would appreciate any information in this direction that participants can supply. He will use his Mark-8 as a sophisticated CCTV Video Titler and Animator (graphics terminal?) and for a music machine courtesy of Phil Mork's music program.

Mr. G. Penner, Bio Medical Electronics, Boca Raton Community Hospital, 800 Meadows Road, Boca Raton, FL 33432 (305) 395-7100

Albert Sardo, PO Box 6678, San Jose, CA 95150 sent a flyer to some participants advertising ICs. I never received one but I heard that he had slow 1702As at $13.

Robert L. Hatfield, 228 - 22nd Street, Ashland, KY 41101 should have a Mark-8 running by now. He is using a Precision Systems power supply. He has received a copy of Scelbi"s "Machine Language Programming For The 8008" and says that this is the best programming book he has ever seen.

LTC Donald R. Kelley, Facility Engineer, Fort Lesley J. McNair, Washington, DC 20319 is working on a Mark-8 but also ordered, received, and assembled the ALTAIR 8800. It is up and running but he is still having trouble with the MARK-8 memory board and shorts.

Geoffrey D. Lowe, 3615 North Pine Grove, Chicago, IL 60613 was not happy with the way NL#6 pages were arranged. He is a programmer (languages: PL/1, FORTRAN, Assembler) on fourth generation IBM equipment (S/370-145, DOS-VS). He ordered parts for the TVT-1 and then found out the PC boards were not obtainable (try Semtronics). When he finally gets a computer built, he plans to use it for financial files, book and record file lists and data retrieval and eventually, graphics. Peripherals will include two cassette drives, TVT type terminal for program entry and monitoring and an off-line printing unit for hard copy and perhaps a floppy disk. He has had excellent luck with Godbout and James as suppliers and received the typical rude response from SWTP when questioning them about TVT-1 boards and parts. He recommends the SCELBI manual and has ordered the new programming manual from them. He would like denser memory boards and wishes someone would put together a glossary of terms especially relating to microprocessors that would help the newcomers to the field understand such terms as scrolling, burned-in IC's, crowbard power regulators, PROM programming, clock rates, etc.

Beardsley Ruml, II, 3306 Cathedral Avenue NW, Washington, DC (202)333-0173 says that now that the computer is properly seen as simply another tool, folks like him who have no training in electronics, will want to learn the necessary background info. We would do him and others a great favor if a small section was devoted to the "beginners" by citing some of the best materials for "starting at the ground floor". (It seems we keep mentioning this over and over but its true. Start with the SCELBI manual, work up to the new SCELBI manual and go from there. We will try to encourage some readers to write some articles for the beginner that will get him started.)

R. D. "Slim" Cummings, 510 West Fifth St., Pittsburg, KS 66762 is WAOEDA and just came aboard.

Jim Farschon, 3949 Mt. Everest Blvd., San Diego, CA 92111 (714) 459-0211 (day) (714) 292-9180 (night) has ordered a MIKE 201 kit with an 8008 and 1k of RAM from Martin Research. He will soon build a scientific calculator interface and is working closely with Mr. George Enos who assembled and checked out his ALTAIR 8800 in two days. George is now impatiently awaiting delivery of a keyboard so he can use it. Meanwhile he is designing a paper tape reader which they hope to build for under five dollars. He is interested in hearing from others in the San Diego area and is willing to serve as the focal point to see if there is sufficient interest to start a local user's group.

Terry G. Harris, 417 Northwestern Drive, Grand Forks, ND 58201 (701) 772-8453 has built the Scelbi 8-H minicomputer -- a very simple construction project from bare bones and an excellent set of instruction manuals, both software and hardware, RE TVT-1 -- just finished, what a mind-bender, wishes he had been a few months slower to take advantage of Dr. Suding's TVT, Scelbi Mag Tape Interface -- works great but he feels awful about spending so much when the Suding unit works so well, SWTP keyboard -- it works. He has ordered Scelbi's new 8008 programming manual and has been toying with the idea of writing a mini ALGOL compiler. The subset would be about 4 to 6 K. He would like info on a good line printer and a floppy disk.

John Bottoms, Box 158 CTS, 1000 West 42nd, Indianapolis, IN 46208 says he has TVT-II boards available for $18.00.

Ron Durnin, 2310 Munroe Avenue, Saskatoon, Sask. S7J 1S5

Per Biorn, PO Box 309, Quakertown, NJ 08868 works for Bell Labs, 2B-310, Murray Hill, NJ 07974 and is presently building a Mark-8.

Lawrence Miller, 826 Halstead Blvd., Jackson, MI 49203 is a graduating senior at Jackson High School and will be going to Michigan Technical University in the Fall. He is building a Mark-8 and a TVT-1 and wants to know if there is a compiler or interpreter for BASIC or FORTRAN for the Mark-8.

Peter Middleton, Box 714, De Kalb, IL 60115 is connected to the Dept. Of Music, Northern Illinois University, DeKalb, IL 60115.

Jim Squires, PO Box 1124, Santa Maria, CA 93454 (805) 925-1402 is employed by Alan Hancock College as a programmer and is working on his Masters Degree at Cal Poly, San Luis Obispo. He is looking for a Masters Degree thesis project and favors an 8080 operating system. I'm trying to get him to write an 8008/8080 operating system built around a pair of Phi-decks. Let's flood him with encouragement and maybe he will.

M. P. Squires, Rt. 2, Box 326, Nokesville, VA 22123 is Jim's brother and an IBM logic designer in Manassas, VA.

S. Joseph Toy, Route 3, Box 73, Chico, CA 95926 has a Scelbi 8-H, the Scelbi cassette tape interface, and their TTY interface. Input is via a Model 15 TTY keyboard and output is on the TTY printer. The system is being used to handle data in a plant breeding program. He is a ham, WB6KAI, and currently operates on 160 meters.

J. W. Ward, 7236 Cirrus Way, Canoga Park, CA 91304 also noticed the same ouput instruction bug described by G. Hart in Vol. 1, NL #5. He has had his Mark-8 working (?) since late December but is still trying to track down an intermittent bug and wants to know if there are any timing diagrams available for the CPU board. He also has trouble with the clock sometimes oscillating at 2 times the correct frequency and will try the fix suggested in NL#5.

Tom Newman, 2230 Sweetwater Drive, San Leandro, CA 94578 (415)352-2315 says that if we need any info on Diablo disks or HYTYPE I to let him know because he works for Diablo-Hayward.

C. Richard Corner, PO Box 2017, Fargo, ND 58102 must have a Precision Systems PS since he wants Dave Chapman's redrawn schematic.

Raymond L. Heinrich, 1726 N. 16th Street Apt. 1, Arlington, VA 22209 (If all the guys in the Washington D.C. area ever get together, they'll take over the whole hobby computer movement.)

Robert Pearce, 28 Hakin Street, Danbury, CT 06810 has the Mark-8 PC boards and plans to use plug-in boards. The back plane will be Radio Shack copper clad 6" x 9" sheet etched for 8 board connectors. He intends to have 8K of 2102 memory.

Mark Spohr, 527 Lafayette Avenue, Cincinnati, OH 45220 says that a National Semiconductor engineer told him that the UV erasable PROMs cannot be indefinitely erased and reprogrammed. After a certain number of cycles (he said 52) the device will not work properly unless it is reconditioned by baking in an oven at 400° for 45 minutes. After this reconditioning, the device can again be erased and reprogrammed 52 times (NS recommends only 35 cycles before reconditioning).

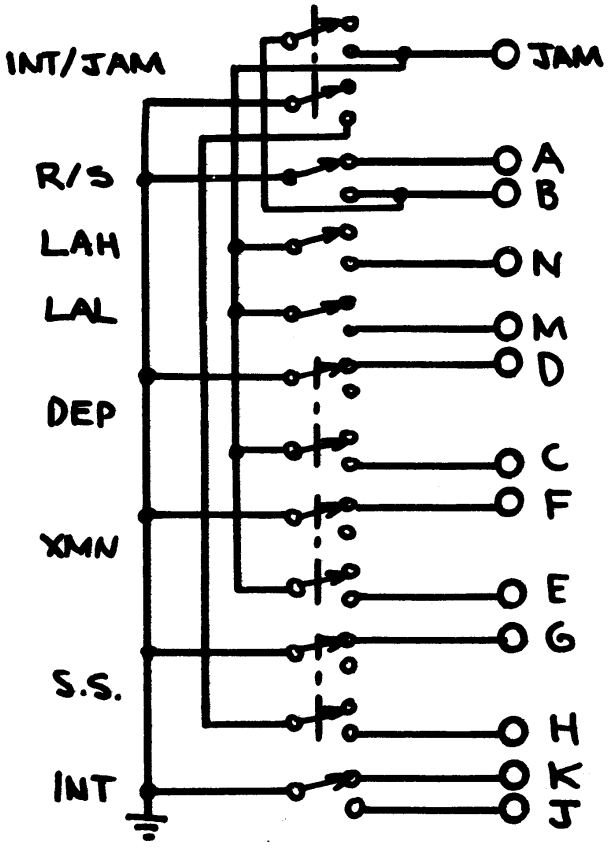
Joseph Weintraub, Lightworks Productions, Inc., 46-16 65th Place, Woodside, NY 11377 is interested in a computer interface with a light pen for video graphics. He says he has done some work with a color set. Where can he buy a light pen? Joe is very interested in joining a local group in the New York Area and if there isn't one, he like to start one. Write him if your interested.

Stephen B. Gray, Amateur Computer Society, 260 Noroton Avenue, Darien, CN 06820 has been swamped by inquiries about the ACS. He says that back issues are available of his newsletters as follows; Volume I consisting of the first 11 issues (1966-1968) at $3.00; Volume II, 12 issues (1969-1972), also $3.00; Volume III, 11 issues so far and there will be several more, $5.00. He's making noises about not continuing his newsletter beyond the few issues left in Volume III. The hobbyist needs all the help he can get. Write him and encourage him to keep publishing.

Mike Anastasion, 6211 Quincewood Circle, Citrus Heights, CA 95610 is a systems analyst programmer III with about seven years DP experience. He has written I/O subroutines, interrupt subroutines, and load business application programs. He has dreamed of having his own home computer for fun and profit since he started in DP and is now waiting for the "dust to settle" before determining the best way to go. So far the 8080 looks promising, especially the ALTAIR 8800, but MITS' I/O device price list has him scared. (Don't panic Mike, anything that works with an 8008 system can be easily modified to interface with an 8080 system and several companies are already cranking out compatible peripherals and ALTAIR owners should have no trouble trading information that they acquire.) He would like to see an article in the NL that would evaluate all available systems so that the beginner could more easily decide which system to build. He has a set of SWTP TVT-I printed circuit boards he is willing to sell and he will trade programming time for electronic goodies.

Richard C. Creighton Jr., 1053 Princewood Drive, Orlando, FL 32810 is starting assembly of an 8080 CPU based computer system. In is currently working in the Medical Electronics (x-ray) service field and formerly was an instructor in the USAF teaching radar repair. He is currently teaching programming to a friend and is trying to complete the computer to make the learning situation more meaningful. He would like to organize a local group in the Orlando or central Florida area. Contact him if you are interested. He is interested in any information on an 8080 operating system and a BASIC compiler. (See what MITS has done.) He also hopes to develop a short form assembler and eventually programs for games and data handling.

Harold L. Novick, Attorney, 2810 Henderson Court, Wheaton, MD 20902 (301) 933-7453 has had his Mark-8 up and running since mid-January. He has two non-electronic problems: 1) Placating one's spouse 2) Getting one's wife at least half interested so it is easier to explain why $50 for more memory is necessary when the ½K installed is not being used because of lack of peripherals. Even his friends are offering to testify against him at sanity hearings. He and Steve Winick may have found a tremendous buy. They are tracking down and hoping to bid on some surplus terminals. With luck, they may be able to offer Dura Mach 10's at $200-$250, Itel 1041 at $300-$350, Dura 1041 at $300-$350, Friden Flexowriter's at $50 to $100, Itel 941's at $200-$250. The catch is that they are government surplus and cannot be assumed to be in operating condition, but at those prices, one could afford to spend another $100 to put them in working shape. Anyone interested should send a SASE. Firm details will be printed in the NL as soon as the details get worked out.
He made the following mods to Phil Mork's front panel switch mods (NL #4). He offers the following program to zero all of the 8008 registers in approximately ½ the usual instructions. In the process of working on our hobby its possible that a patentable development may come up. Hal provided this information:
Patents: A patent is good for 17 years from the date of issue and prevents others from making, using, or selling the patented invention without permission. A patent doe NOT give the owner the right to make his own invention since since someone else may also have a similar patent which would prevent this. If anyone publishes a description of the invention or if anyone publicly uses or sells an embodiment of the invention (including the inventor) more then a year before a patent application is filed, the invention becomes public property and a patent of it is forever barred. I asked if he would be willing to answer preliminary questions participants might have regarding patent problems and he graciously agreed.

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250 - Exclusive OR A register with its self
310 - Xfer A register to the B register
320 -        "                 L    "
330 -        "                 D    "
340 -        "                 E    "
350 -        "                 H    "
360 -        "                 L    "
```

Program To Zero 8008 Registers.

Switches shown In The RUN Mode

Hal Novick's Mods To Phil Mork's Front Panel Mods.

Bill Fuller, 2377 Dalworth 157, Grand Prarie, TX 75050 has this to say:

I'm one of those Altair owners, so maybe my comments should be heard. I get a litkle perturbed about some of the bad-mouthing, especially when it is related to emotional reaction. My reasons for going Altair and 8080 was because:

1) At the time I became committed to a home computer (Nov./Dec. 74) differences in price between Altair and others available was not great.
2) ordering from multiple sources and hoping I got everything and it was good left me uneasy.
3) the 8080 IC was priced at $360.
4) I had no source that said I would be able to convert from the 8008 to 8080 within a reasonable price range.
5) I did not know that the Micro-8 NL had already covered so much territory. My only knowledge of "you-all" was a letter to the editor in R-E, until you cropped up in MicroMini Mart NL.
6) I sent my $5 and $10 everywhere info was advertised. Some top-notch, some garbage.
7) I figured I would do all my own design around the basic Altair if I had to, since I was "all alone'.
8) Uncle Sam owed me money.
9) I was interested in limited use--teaching machine and game machine.
10) I was frustrated by reading 1000 pages of claims and counterclaims by CPU manfacturers and writers.
11) The Intel was best supported and Altair was using it.
12) I'm not an expert in programming or hardware.
13) No one knew that parts I couldn't afford one week would be cheap the next week.
14)Ad infinitum.

How do I feel about the Altair? I partially knew what I was getting into, only 250 words when I knew I would need a basic 1000.for what I wanted to do at the time. Since my uses have grown, I see that I got my work cut out for me if some of the attitudes in the NL become prevalent. That attitude being the hell with the Altair and in some cases the 8080. I think there is a place for all models and configurations whether it be 8008, 8080, Altair, PDP, F-8, MC6800, 4040 or whatever.

If we sit around criticising what each other has, instead of trying to work out the mutual problems, then we'll all end up like a guy I met in Dallas. He just got his computer working after 5 years of effort. Think of what went through his mind when he realized his 100+ IC CPU had just been replaced by a cheap multipin IC. I think the desire to standardize is in the right direction. I agree with Larry Pleskac comments--most of us are not far enough along to provide comments. I'm still trying to dig through the M & P ECS Series. Somewhere between ECS 5 and 7 I became lost. Mainly because I need the "hands-on" along with the theory.

Sure I'd like a PDP-11 or something built around the 6800, but I just came out of the DO Loop of frustration trying to determine who was talking and who was acting. So maybe some year Uncle Sam will come across again, then my kids will have the first generation micro.

Robert A. Van Winkle, 12717 Folsom Blvd., #32, Rancho Cordova, CA 95670 has collected the parts for his Mark-8 and plans to etch his own boards and include edge connectors on all boards. He is currently attending classes at Sacremento State and will really get moving after finals. He will make his PC board layouts available to any participant interested. He'd like to acquire an MF8008 manual.

Roger Smith, Smith Enterprises, 4502 E. Nancy Lane, Phoenix, AZ 85040 gives a red-faced thanks to R. D. Hogg who caught his "boo-boo" on the UART I/O board. When he built his TVT, he didn't install diodes D10 thru D14 since he held these bits low on the keyboard where his CLEAR key was. In the intervening months, he forgot his TVT was different in that area. He received an ALTAIR 8800 last week and had it running in two days but his Mark-8 is still not up. He doesn't think he will be buying any other "inexpensive add-ons" from MITS but couldn't resist the "loss leader" initial price. He enclosed a copy of a cross-listing of the 8008 and 8080 instruction sets included elsewhere in the NL.

Jim Lefwich, MD, Geophysical Communications Systems, 410 South Glendora Avenue, Suite 140, Glendora, CA 91740 (213) 335-1241 says he can't remember ever reading a piece six times and enjoying it more (NL #5). Having fought his way thru a full blown processor in 1965-1967 with discretes (transistors, not IC's) and no one around with similar interests, he can assure us that he will be a staunch supporter of our hobby effort. He wears two hats - a general practice of medicine with an adjoining electronics lab for the remaining. It looks like its time to build again so he is trying to decide which way to go. A suggestion for Jay Bowden's power supply circuit in NL#5, if you move one of the diodes so that it is in series with the 150 ohm charging resistor and supply, if the supply zaps shorted, it will isolate the short from the battery and the gear will not load the battery.

Peter Vickers, 162 Nehoiden Street, Needham, MA 02192 (617)444-1410 has had his Mark-8 running for about three months. Consturction on the Mark-8 and TVT begain in mid-October. By the end of November trouble-shooting most of the boards was under way. By the end of January, his room was a junk pile, savings gone, bills unpaid, study habits destroyed. As soon as the units were working exactly right with no more bugs, they were shoved into the corner and not touched again until normalcy finally returns.

Tom Boyko, Varian Data Machines, 12062 Valley View, Suite 204, Garden Grove, California 92645, (remember him from NL #5?). Tom did it the hard way, but probably faster than all of us put together. His wire-wrapped version of the Mark-8 is up and running with his music program playing "A Bicycle Built for Two." (Tom has a subscription to Radio-Electronics but somehow missed last July's issue which described the Mark-8. It's hard to imagine where he would be now if he had got started then.)

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Several people have mentioned that the information in the NL is rather hard to digest because it is all so scattered around without any organization. We agree, but this is the nature of the beast. If anyone would care to put together an Index/Cross-reference of any kind we'll be happy to publish it.

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Phil Glazer, Ace Electric Service, 40 Broadway Ave., Trenton, New Jersey 08618, says that he can't work, take care of his family, cut the grass, paint, etc. Between our group, the Digital Group & Dr. Suding, the Computer Hobbyist, and the People's Computer Company he is going bananas and beserk! But, he says he is certainly learning plenty & that is what it's all about. He recently finished his TVT I.

NEW ADDITIONS TO THE ROSTER

Gary Alevy, Emory University, Box 21393, Atlanta GA 30322, (ph: 377-4907), is interested in building a Mark-8 and would appreciate any tips on purchasing the various components.

Alan S. Bailey, McKee Vocational & Technical High School, 290 St. Marks Place, Staten Island, N.Y. 10301

Meir Baran, Department of the Army - Picatinny Arsenal, Dover, N.J. 07801 (SARPA-AD-F-D)

Robert A. Barber, 7 Johnson Place, Ardsley N.Y. 10502, is currently building a Mark-8.

Elmer T. Beachley, 5601 Penn Ave. Apt. C-79, Pittsburgh PA 15206, heard about us thru the People's Computer Company.

Neil A. Benson, 10040 Nicollet, Bloomington Minn 55420, has about 3/4 of the parts for a Mark-8. Hal Chamberlain of the "Computer Hobbyist" suggested he get in touch with us before starting construction.

E.L. Bethel, 418 E. School St., Kent OH 44240

Gary K. Berkheiser, 601 Bath St., Bristol PA 19007, is a technician and hobbyist with an interest in micro-computers for both hobby and commercial purposes.

John Bird, Associate Prof, Community College of Baltimore, 2901 Liberty Heights Ave., Baltimore MD 21215

W.A. Bobisud, Route 1 Box 559-D, Grass Valley CA 95945, is a retired Electronics Engineer who has been recently afflicted with 'computeritis'. He has just completed assembly of an Altair 8800 and is presently trying to develope a less expensive I/O card than that provided by Altair. He heard about us thru the Digital Group Clearinghouse.

Robert K. Burant, HMX-1 Exec Flt MCAS, Quantico VA 22134, hasn't made up his mind which way he'll be going (choice of system) but he's getting ready to make the plunge.

John Burger, 1440 Leopold St., Jasper INDIANA 47546, has a Mark-8 up and running with a TVT attached. He's building a cassette interface and is planning to buy the Monitor & 16K Rom thru Mini Micro Mart.

T.F. Caldwell, P.O. Box 116, Burgess VA 22432, is just completing a TVT and is in the process of accumulating parts for the Mark-8.

H.N. Campbell, R.D. 3 - Brockway Road, Moravia N.Y. 13118, has a completed Mark-8 micro-computer which does not compute. As a matter of fact, it doesn't do anything! Upon re-reading some back issues of RE he ran across Hal's letter in the Oct issue. He is now one of us and the happy recipient of all those de-bugging tips in NL's 1 thru 5.

Douglas Faunt Jr., 310 Holly St., Columbia SC 29205, is going in the direction of the DEC LSI-11 (see NL #6), and is building a terminal with Mini-Micro Mart's Univac printer mechanism.

Michael Christoffer, 4139 12th N.E., Suite 400, Seattle WA 98105, is a graduate engineering student at the University of Washington. He just completed construction of an 8008 based microcomputer and is looking forward to some heavy software development.

Lynn E. Cochran, 377 Laurie Meadows Dr., Apt #327, San Mateo CA 94403, is waiting for his Altair 8800 to arrive and is planning to go the Solid State Music memory board route. He, and some of his friends (who have also ordered 8800's) will probably work together on developing I/O boards and a priority interrupt system.

-- And, Lynn, don't worry about providing "camera ready" copy for the newsletter. We're very happy to hear what you newcomers are interested in and planning to do. Those of you that have only sent us your name and address.....we, and everyone else, would like to hear of your plans and/or thoughts. --

C. R. Corner, 514 South 9th St., Moorhead MN 56560

Robert G. Confrey, PSC Box 4636, Beale AFB CA 95903

Richard C. Creighton, 1053 Princewood Dr., Orlando FL 32810

Mark G. Crook, 3 Bel Air Rd., Delmont PA 15626, would like to get the plans for the Mark-8. (They can be ordered from Radio-Electronics, Micro-computer, P.O. Box 1307, Radio City Station, New York N.Y. 10019, for $5.00)

L. Dabrowski, 1815 N. Karlov Ave., Chicago ILL 60639

Gary L. Dickman, 707 Elm St., Hays KA 67601, Ph: (913) 625-9693 or 462-3439

Steven Dompier, 2136 Essex St., Berkeley CA 94705, is currently building an Altair 8800 with disc drives.

James Dunion, 421 Ridgecrest Rd., Atlanta GA 30307, is a graduate student in Information and Computer Science at Georgia Tech. He has built a Mark-8 and the Altair 8800 and is looking for suggestions as to how he could make contributions to the User's Group. If you've got them things built, Jim, then it's software development time....and we'd love to share your efforts with the others.

Robert H. Erbe Jr., #263, 614 W. 36th Pl., Los Angeles CA 90007

David J. Evans, 754 S.E. Daytona Drive, Palm Bay FL 32905, Ph: (305) 724-2613, is an instructor in Computer Science and is currently working toward a Ph.D. in Electrical Engineering. He has built a microcomputer around the 8008 and is very interested in software and hardware developments.

Edward M. Evans, 46 Knoll Crest Ct., West LaFayette IND 47906, is an Instrument Specialist at Purdue University. His recently completed Mark-8 is currently in the de-bugging stage, and he has also built a TVT which works great.

Charles R. Goetowski M.D., 2506 Victor Ave., Glenview ILL 60025, Ph: 729-8886

John Ford, 5561 Esplanada Ave., Santa Maria CA 93454, has a noble project in mind. He is going to develope a modular CHESS program which hopefully can be reduced to 4K, using an overlay technique to roll program segments in and out of memory. (There, John, now you're committed.)

W.C. Fuller, 2377 Dalworth 157, Grand Prarie Texas 75050

Jeff Goldberg, 826 Cambria Ave., Santa Maria California 93454, Ph: (805) 937-5558

Jack Gray, 264 East 21st Street, Paterson NJ 07513

John Hardesty, 909 E. Grovemont, Santa Ana California 92706, is a "four-bit people". He is building a microcomputer using the Intel MCS-4040 and is, of course, interested in the same type of peripherals being built and acquired by us "8-bit people".

Robert L. Hatfield, 228 - 22nd St., Ashland Kentucky 41101

Gray Hoffman, 1502 Spillers Lane, Houston Texas 77043

Donald E. Houghton, 1864 Ortonville Road, Ortonville Missouri 48462

J.P. Hunter, 1207 Malgren Ave., San Pedro, California 90732

Doug Inglis, 2711 So. Eby St., Terrace, B.C. Canada V8G 2X4, is a Computer Science teacher with an interest in micro & mini computer development.

H.J. Kearns M.D., 14421 Wilson Road, Edmond, Oklahoma 73034

Carl R. Kelb, 3775 Nathan Way, Palo Alto, California 94306, has built an 8008 based microcomputer along with Don Lancaster's TVT modified to 80 characters per line.

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Speaking of Mr. Don Lancaster...he sent in a check for membership in the User's Group and Hal Singer promptly returned it with a letter expressing his (and our) gratitude for the contributions he has made to the microcomputer hobbyist field. Thanks again, Don, and welcome aboard.

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Robert A. Kern, Chief - Computer Services Unit, A-306 East Fee Hall, Michigan State University, East Lansing, Michigan 48824, indicates that his department is seriously considering construction of a microcomputer system.

Jack W. Klincher, 15448 Meyers Road, Detroit, Michigan 48227, Ph: (313) 345-4974, is "investigating the field" and trying to decide which microcomputer system he is going to build.

Dick Kopitzke, 200 W. Midway Drive #177, Anaheim, California 92805, is quite enthused about getting started on the Mark-8 and plans to use it as a "brush-up" learning tool (he has previously worked on some of Autonetic's 2nd & 3rd generation nav system computers). He is also looking for employment in "electronics test, computer/digital test, engineering assistant or a Quality assurance function related to those postitions." Phone: (714) 535-7001.

Richard Kulka, 283 Poplar St., Mansfield, Ohio 44903, is in the process of making the PC boards for the Mark-8 and the TVT. He's been playing with electronics for the past 10 years and is looking forward to getting into this latest thing.

Charles (Chuck) W. Leroy, 116 Somerset Pl., Lompoc, California 93436, Ph: (805) RE 6-5475, is currently checking out an Altair 8800 and will be interfacing it with a surplus keyboard, TVT II (modified for direct mem access, Read/Write, & without keyboard), cassette, and graphic CRT display. He's very happy about the fact that PCC is developing a mini-BASIC. (I think we'll all be happy to see a BASIC which we can all use.)

Charles A. Lewis, 3435 Woodmar Courts, West Lafayette, Indiana 47906, has completed the Mark-8 but is having trouble getting it running (perhaps the past NL's will help solve the problem, Charles. If not, let us know.) He says it will address, load, & examine....but not run. He has plans for interfacing a mag tape when it becomes operational.

Ric Martin, WA5TML, 13709 Preston Rd. #232, Dallas, Texas 75240, is building the Mark-8 and TVT I. A Klienschmidt 311 RO will be used for hard-copy (at 300 baud).

Harrison R. McCray Jr., 6716 Rugby Lane, Charlotte, North Carolina 28211

W.H. McCarter, PO Box 864, Slidell, Louisiana 70458

Thomas E. Morgan, 3904 King Arthur Road, Annandale, Virginia 22003

Christopher S. Ott, 47 Mueller Dr., Charleston, South Carolina 29407, is looking for a de-bugged & running Mark-8 for purchase.

Richard A. Peterson, 9004 184th Ave. E., Sumner, Washington 98390, is in the final stages of assembling his Mark-8 & TVT. He heard about us thru Maury Goldberg's "Mini-Micro Mart" and would like to know if anyone has tried driving the UNIVAC 0769 printer that is advertised? He's going to order the MIL Monitor 8 ROM (correction....has ordered). (Most of the questions in your letter, Richard, will be answered in the previous NL's.)

Richard W. Raver, 2842 N. Richmond St., Chicago, Illinois 60618

David P. Rennie, P.O. Box 33388, Houston, Texas 77033, heard about us thru the Digital Group Clearinghouse.

Richard Rhinevault, 79 Sprucewood Circle, Geneva, New York 14456

Joe D. Ringland, P.O. Box 4784, Rolling Bay, Washington 98061

William (Bill) J. Risch, 471 Geneva Apt 212, Aurora, Colorado 80010

J.B. Ross, Asst. Prof. of Physics, Dept. of Physics, Park College, Kansas City, Missouri 64152

Jeffrey P. Royer, 1568 Mariposa Ave., Palo Alto, California 94306, states that "we are in the process of building a Mark-8", and they're planning to use it as an educational exercise and later for computer-controlled games & musical applications. (Who are "we", Jeff?)

Frederick L. Kahl, T&F Electronics, 704 Courtland Circle, Western Springs, Illinois 60558

John D. Turner, NAVSEEACT Japan, Box Five, FPO Seattle, Washington 98762, is awaiting an Altair 8800. He is working near Tokyo at the present and expects to return to the states next year.

Duane L. Gustavus, 818 W. Hickory, Denton, Texas 76201, is completing construction of an Altair 8800 w/1K of static memory. He expressed slight reservations for not going the 8008 route because of the support from groups such as ours. (Don't worry, Duane, it looks like this group is going to be just as active in 8080 software & hardware development as the 8008.)

William H. Freeman, 816 Meadowlark Lane, Glenview, Illinois 60025, is a registered Professional Engineer who recently attended a course on microprocessors at Northwestern University. One of the instructors (Prof. W.J. Lennon) suggested the NL would be of interest. (We hope so.)

Ernst J. Schubert Ph.D., Computer Institute for Continuing Education, POB 851, Los Alamitos, California 90720, is one of the founders of the Institute, and has started a project to build a microcomputer and interface it with an ASR 33 and cassette. He plans to develope an Operating System using BASIC and will be happy to share the results with the User's Group.

William E. Shawcross, 1105 Massachusetts Ave., Cambridge, Massachusetts 02138 Ph: (617) 547-7652

Neal Sheffield Jr., D.D.S., W4ZPZ, 2601 Oakcrest Avenue - Suite E, Greensboro, North Carolina 27408

Robert Sherman, 1010 North Palm Ave. #201, Los Angeles, California 90069

Randy Soderstrom, 4601 Goldfinch Dr., Madison, Wisconsin 53714

Charles D. Soucek M.D., 2807 Ohio, Kansas City, Kansas 66102

Capt. John R. Stanton, 2930 Currie St., Biloxi, Mississippi 39531

Donald E. Tarbell, 144 Miraleste Dr. #106, Miraleste, California 90732, is a busy man indeed. He designed and built his own computer system and has been operating it for the last four years. The CPU is an 8-bit, byte-oriented machine with 16-bit Accumulator, Prog Cntr, & Index Registers (5). It has 60 instructions w/8 addressing modes (both to be expanded). The peripherals include a Model 32 TTY, CRT & keyboard, 500 Kbyte disc, modem, X-Y Plotter & audio cassette. He intends to install 2 more CPU's - - an 8080 and a microprogrammable processor with Writable Control Store. The three processors will share memory (36 Kbytes) and peripherals. He has also developed extensive software which includes a BASIC interpreter and a Sentence Processing Language. (Ya gotta lotta guys boilin' over with envy, Don. I hope yur happy!)

Gary D. Thurmond, 1040 Meadows End Dr., Calabasas, California 91302, W6STR, Ph: (213) 340-1664, just completed the TVT and is waiting for a MOD-8 from Mini-Micro Mart (and the MIL Monitor-8 Rom). He's quite enthused about this new hobby & has really been bitten by the bug.

S. Joseph Toy, Route 3 Box 73, Chico, California 95926

Laurence E. Turner, #102 3023 Blakiston Dr. N.W., Calgary, Alberta, Canada, is interested in the MOD-8 and is wondering if layouts (or negatives) are available for making his own boards? He is presently building some terminals and cautions that the General Instruments keyboard encoder sold by B&F Enterprises is likely not the standard 2376 ASCII encoder as claimed. (Out of two completely separate orders both encoders he recv'd were custom encoders - & B&F would not accept them for return.)

Robert A. Van Winkle, 288 Woodbridge St., Yuba City, California 95991, has two Micro-8's (Mark-8's ?) under construction and "is anxious to meet and/or correspond with anyone working with these items." (We might be able to help you out there, Bob.)

Andrew Vics, Media Co-ordinator, Pequannock Township High School, Sunset Road, Pompton Plains, New Jersey 07444, indicates his school is currently involved in microcomputer experimenting and is interested in the TVT.

L.G. Walker, Rt 1 Box 272, Aledo, Texas 76008, is an analyst and scientific programmer with 16 years of experience in the field. He is currently working as a member of a software team designing and building mobile computerized systems. (And, we sent him a requested copy of the NL so that he can get bit by da bug, too.)

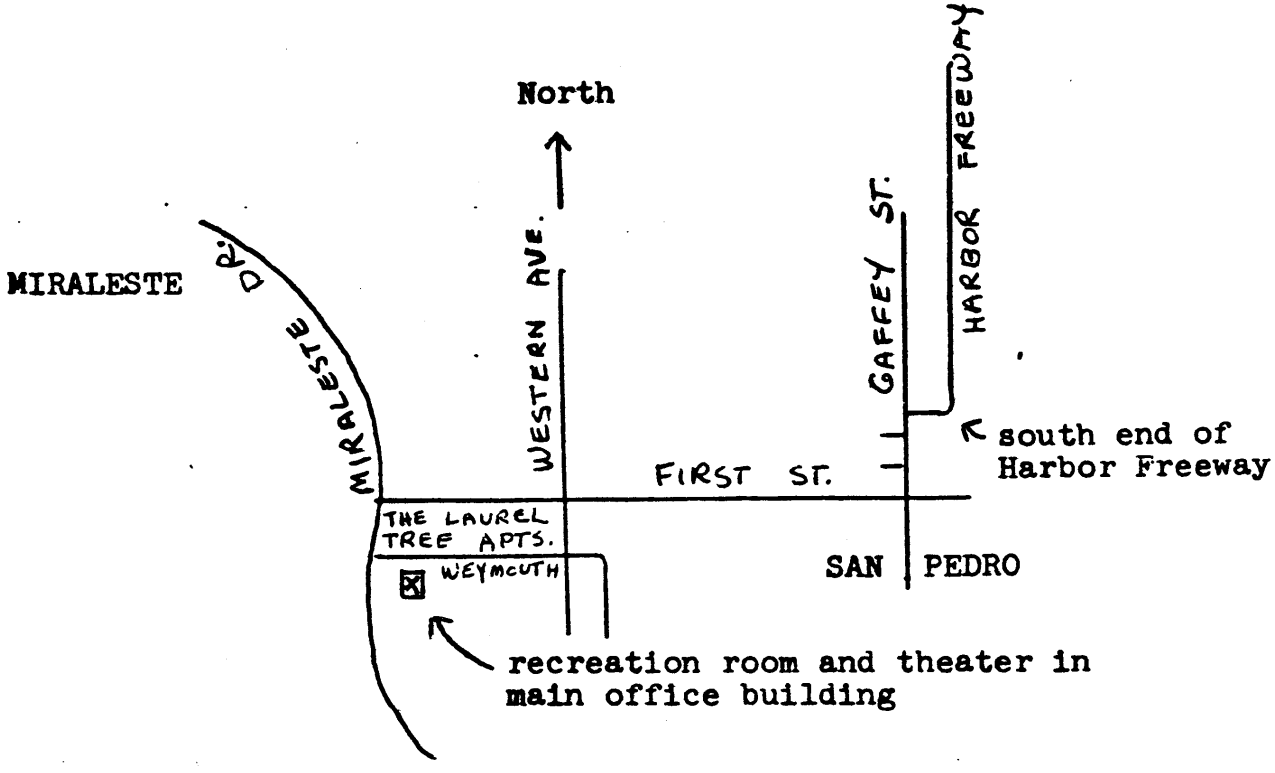
Tate Yoshida, 2951 S. Martin Luthur King Jr. Dr., Chicago, Illinois 60616, heard about us thru the Digital Group.

Bruce Robinson, R[illegible] Gananoque, Ontario, Canada, is an instrumentation design engineer doing analog-to-digital conversion using an 8008 based PRO-LOG microcomputer (for a living). He's very interested in microcomputer applications for model railroading and has some things working in that area. He has also come up with some inventions in the Ham radio field.

Robert Zahorcak, 40 Maple Lane, Lake Hiawatha, New Jersey 07034

Pearce Young, 9478 Cherokee Lane, Beverly Hills, California 90210, is a Los Angeles County Superior Court judge with an interest in electronics which was previously concerned with ham radio and is now actively involved in the computer hobbyist field (by way of a MITS Altair 8800). He, together with Don Tarbell (see page) and a few others, are organizing a meeting of enthusiasts in the Los Angeles area for June 15th. The meeting will be at 2:00 P.M. in the recreation room at Don Tarbell's apartment building (Laurel Tree Apts.). Please drop a note to Don and let him know if you will be attending and how many in your party (Donald E. Tarbell, 144 Miraleste Drive, Apt. 106, Miraleste, Calif. 90732). If you have any items to sell or trade, bring them along. Also, if it is not too large, feel free to bring your own computer. Following is a map showing how to get to Don's apartment:

MAP TO MEETING PLACE



NOTE:

It would be best to park along Miraleste Drive, since most of the apartment spaces are numbered, and subject to towaway. There may be a few "guest" parking spaces available if you arrive early.

Introduction to the MIKE 2

Martin Research has received hundreds of inquiries about our microcomputer modules--both from readers of our book, *MICROCOMPUTER DESIGN*, and from computer hobbyists. Demand for the *MIKE 201* exceeded our initial supply of printed circuit boards. Volume production of PC boards is now underway, and we expect to begin shipping again on June 16, 1975.

Before you decide you can't wait, let us describe what we believe is the best microcomputer yet available.

FIRST: All of our parts are new and of top quality. No factory seconds or temperature rejects.

SECOND: All printed circuit boards are commercial quality, made by professional PC houses to our specifications. Component holes are plated through for easy solderability. Each board comes with its own connector for rapid insertion and removal.

THIRD: The system architecture has been designed for optimum flexibility. It uses a carefully-designed bus structure which permits *any* board to be inserted in any position on the bus. To expand the system, you simply plug more boards onto the bus.

FOURTH: All critical control signals needed throughout the system are decoded right on the CPU board and piped around the system on the bus. Hardware interfaces to the microprocessor generally need only two chips--one strobe decoder, and one latching device (for output ports) or three-state driving device (for inputs).

FIFTH: There are no critical adjustments during assembly. The main timing is controlled by a reliable crystal on the CPU board.

The Boards

The *MIKE 203* system contains four circuit boards, described below.

MIKE 2-1 CPU BOARD An 8008, crystal-controlled oscillator, and all the timing for the system. The bidirectional bus drivers on the CPU board allow many accessory boards to be added to the microcomputer.

MIKE 2-20 CONSOLE BOARD The *MIKE 2-20* has six large, 0.3-inch seven-segment display digits and a twenty-key calculator-type keyboard. Unlike systems with banks of toggle switches and lights, this micro is easy to program, since codes are easily visualized. The six digits are driven by decoding latches, and can be read in octal, decimal, or hex; they are user-accessible, constituting three output ports.

MIKE 2-3 PROM/RAM BOARD This board has room for up to 1K of RAM (1024 eight-bit bytes, or 8192 bits) and 2K of PROM (2048 bytes). Handles up to eight 2112s and up to 8 1702As. The basic system, the *MIKE 203*, uses 256 words of RAM (two 2112s) and 256 words of PROM (one 1702A). The PROM is preprogrammed with our monitor program, described below.

MIKE 2-15 BREAD-BOARD

A standard-sized *MIKE 2* board, with a connector for interfacing to the system bus. All power and bus signals are accessible. Pre-drilled with over 700 holes, with half the board configured for standard 14- and 16-pin DIPs (+5 and ground at the corners), and the other half with universal spacing, for any size sockets.

MIKE 2 Monitor

Just as important as the hardware is the *MIKE 2 MONITOR* that comes with the *MIKE 203*. Consisting of 256 words in a single 1702A PROM, *M2M* allows you to write instructions into memory at any location, and read instructions, simply by punching the keys on the keyboard.

DATA ENTRY

Instructions and data are entered into the *MIKE 2* simply by punching the keyboard. With a little practice, it's just as fast as your pocket calculator. As a key is pressed, the digit appears on the LED display. When a second digit is entered, the first automatically moves left and the second takes its place. For example, say you are entering the number *135*, which is the octal number for an 8008 *OUTPUT 16* instruction. You type in the *1*, and the display reads *000001*. Then you press the *3*, and the digits say *000013*. Finally, you press the *5*, and the display reads *000135*. (Incidentally, you do not have to punch in leading zeros.) As the data appears on the displays, it is also loaded into the 8008's E register, where it is available for further use.

A number of special-purpose keys on the keyboard are used to program the microcomputer.

LOAD H KEY

This key is used to address memory. It transfers the contents of the 8008's E register to its H register, then clears the E register (to 000). For example, you have just entered *010* onto the display; now you press this key. The 8008 H register address is now *010*, and this is the new high-order memory address for writing into and reading from memory.

LOAD L KEY

This key also references memory, at its *low-order* address. Together, the LOAD H and LOAD L keys can address any location in the 8008's full complement of 16K of memory. After the LOAD L key loads the L register from the E (clearing the E), the display blinks back and forth between the *address* of memory, and the *contents* at that address.

WRITE KEY

This key writes into RAM memory. It takes the value previously entered into the E register, writes into RAM at the H/L memory address, and clears the E register. Then it increments the L register (and the H if the L overflows), preparing the user for the next instruction. Now the display begins to alternate between the new address in memory and its contents.

READ KEY

This key reads the contents of RAM or PROM at any address, as selected by the LOAD H and LOAD L keys. The display alternates

between memory address and contents. Each time the READ key is pressed, the program automatically steps to the next-higher location in memory, so that you can check the contents of a whole program quite rapidly.

EXECUTE KEY This key jumps to location 010 000 in RAM memory and executes whatever program you have stored there.

INTERRUPT KEYS One key sets the interrupt flip-flop on the CPU board *low*. (Now no peripheral device on the *MIKE 2* bus can cause an interrupt.) The second key resets the flop, causing an interrupt to the 8008. The *M2M* program takes over, saving the status of the 8008's internal registers automatically. (The A register contents are at 013 370 in RAM; B, at 013 371; C, 013 372; D, 013 372; E, 013 374; flags, i.e, carry, parity, sign, zero, 013 375; H, 013 376; and L 013 377.) The digital display automatically flashes back and forth between location 013 370 and the contents of the A register. The other saved registers and flags can be read out in succession by pressing the READ key. This feature allows the user to use the 8008's interrupt capabilities without including status-saving software in each program.

CONTINUE KEY This key continues execution of the main program at the point where the CPU left off when it was interrupted.

Programming

Here is an example of a program for testing operation of the *MIKE 203*. First, the program; then, how you load it in and execute it.

THE PROGRAM

010000	304	LAE	LOAD A REGISTER FROM E REGISTER
010001	004 021	ADI 021	ADD 021, I.E., 00 010 001 (OR, 0001 0001)
010003	100 007 010	JFC 010007	IF THE A REG. HAS NOT YET OVER-FLOWED, FALL THRU NEXT INSTRUCT.
010006	250	XRA	OVERFLOW; CLEAR A REGISTER
010007	340	LEA	STORE THE COUNT IN THE E REG.
010010	133	OUT 15	OUTPUT TO DIGITS 1 & 2, 4 BITS FOR EACH DIGIT
010011	135	OUT 16	OUTPUT TO DIGITS 3 & 4
010012	137	OUT 17	OUTPUT TO DIGITS 5 & 6
010013	045	RST 040	JUMP TO LOCATION IN M2M PROGRAM WHICH DEVELOPS 1.2 SEC. DELAY
010014	104 000 010	JMP 010000	START AGAIN

ENTERING THE PROGRAM

1. *1, 0.* (Display reads *010.*)
2. *LOAD H.*
3. *LOAD L.* (This loads L register with *000*. Now memory location is *010000*. Digits flash this address and its current contents.)
4. *3, 0, 4.* (*304* on display.)
5. *WRITE.* (Display moves to next location.)
6. *4, WRITE.*
7. *21, WRITE.*
8. *100, WRITE.*
9. *7, WRITE.*

11. *16, WRITE.*
12. *256, WRITE.*
13. *340, WRITE.*
14. *133, WRITE.*
15. *135, WRITE.*
16. *137, WRITE.*
17. *45, WRITE.*
18. *104, WRITE.*
19. *WRITE.* (Unnecessary to punch *000.*)
20. *10, WRITE.*
21. *EXECUTE.*

The display will now count as follows, changing once every 1.2 sec.:
111111 222222 333333 444444 555555 666666 777777 888888
999999 AAAAAA bbbbbb CCCCCC dddddd EEEEEE FFFFFF 000000
111111 ETC.

The System

MECHANICAL The *MIKE 203* is complete except for a cabinet of your own design, and a power supply. The four boards provided each measure 5.5 by 7.0 inches (140 by 178 mm), and include a fifty-pin connector at the rear which connects to a fifty-wire flexible cable. The boards stack up, one on top of the other, and are separated by rigid metal spacers (provided). Eighteen inches (457 mm) of cable are supplied with the *MIKE 203*, more than enough for foreseeable expansion.

POWER Power requirements for the basic *MIKE 203*, including only those basic memory chips detailed above: +5 V, 1.4 A; -9 V, 70 MA. A power supply providing these voltages and ±12 volts as well is under development and will be announced shortly.

Extras

A number of circuit boards are under development:

MIKE 2-5 4K RAM BOARD Available as this sheet goes to press, our 4 K RAM board has room for up to thirty-two 2102 static RAM chips. It includes decoders and bus drivers for complete interfacing with the *MIKE 2* system. Adds up to 4,096 bytes (32,768 bits) of memory. Requires a single +5-volt supply.

MIKE 2-6 CRT DISPLAY INTERFACE.

MIKE 2-9 CASSETTE RECORDER INTERFACE, for use with audio machines.

MIKE 2-10 TELETYPE INTERFACE, for hard copy. Includes control ROM.

MIKE 2-14 PROM PROGRAMMER, for 1702A PROM memories.

MIKE 2-? YOUR SUGGESTIONS APPRECIATED.

For further details, stay in contact with Martin Research. To be added to our mailing list, just drop us a postcard or call us up; we'll send you bulletins as new developments occur.

5/75

MR RESEARCH
1825 S. Halsted St.
Chicago IL 60608
(312) 829 6932

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PART	DESCRIPTION	BOARD & CONNECTOR ONLY	KIT	ASSEMBLED & TESTED
MIKE 2-1	CPU board, without 8008	19.95	54.95	74.95
MIKE 2-1A	CPU board with 8008	-----	94.95	114.95
MIKE 2-1B	CPU board with 8008-1, fast crystal (60% faster than standard 8008)	-----	99.95	119.95
MIKE 2-20	Console board	19.95	68.95	83.95
MIKE 2-3	PROM/RAM board with 1-1702A (*M2M* program), 2-2112s	19.95	78.95	93.95
MIKE 2-15	Breadboard	19.95	19.95	-----
MIKE 2-030	18" cable and spacers	-----	4.50	6.00
MIKE 2-100	*MIKE 2* MANUAL	-----	10.00	10.00
MIKE 203	*MIKE 2* microcomputer system. One each: 2-1, 2-20, 2-3, 2-15, 2-030, 2-100. Without 8008.	-----	229.95	279.95
MIKE 203A	*MIKE 203*, with 8008 microprocessor	-----	269.95	319.95
MIKE 203B	*MIKE 203*, with 8008-1, fast XTAL	-----	275.95	325.95
MIKE 2-5	4K RAM board. No 2102s, decoders	28.95	-----	-----
MIKE 2-5A	With decoders, 1K of RAM, 450 ns speed	-----	77.95	99.95
MIKE 2-5B	With 2K of RAM, 450 ns	-----	107.95	130.95
MIKE 2-5C	With 3K of RAM, 450 ns	-----	136.95	160.95
MIKE 2-5D	With 4K of RAM, 450 ns	-----	164.95	189.95
2112	Extra 2112 256 x 4 RAM ICs for *MIKE 2-3*	-----	4.75	-----
1702A	Extra 1702A PROMs for *MIKE 2-3*	-----	24.95	-----
MOD-8	7-1702A PROMs, programmed and tested with Microsystems' *MOD-8* monitor program	-----	-----	159.95
MOD-8/CREED	8-1702A PROMs, programmed and tested with modified *MOD-8* for use with 5-bit *CREED* teletypewriters	-----	-----	179.95
MIKE 2-151	Universal I/O breadboard kit: breadboard, chips for interfacing any eight-bit parallel input/output source. With *MIKE 2-15*, connectors, instructions, 1-74LS138/3205, 1-74273, 2-74125s.	-----	27.95	-----
MIKE 2-16	*CREED* interface board. Connects 5-bit *CREED* machine with *MIKE 2*. Available as kit only (*MIKE 2-15* plus kit of parts).	-----	34.95	-----
MICRO-COMPUTER DESIGN	A 300+-page book on hardware design around the 8008. Write for details, pricing. Price with *MIKE 2* purchase of $200 or more:		-----	50.00

mike 2

HANDLING CHARGE Our minimum order is $25.00. Orders for less than this will be charged an additional $1.00 for handling.

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QUANTITY PRICES Please contact Martin Research for quotations on quantity prices on *MIKE 2* parts and systems. Educational rates have been established for the book *MICROCOMPUTER DESIGN*; educators, please write on your letterhead for price lists.

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WARRANTY POLICY Parts and circuitry guaranteed to operate as advertised. Parts on warranty for thirty days. However, we cannot be held responsible for damage to parts determined to result from carelessness or misuse. In case of problems, please write Martin Research with an explanation. In order to ensure credit, please do not return goods until you have received written permission.

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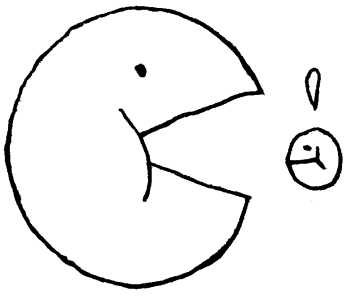


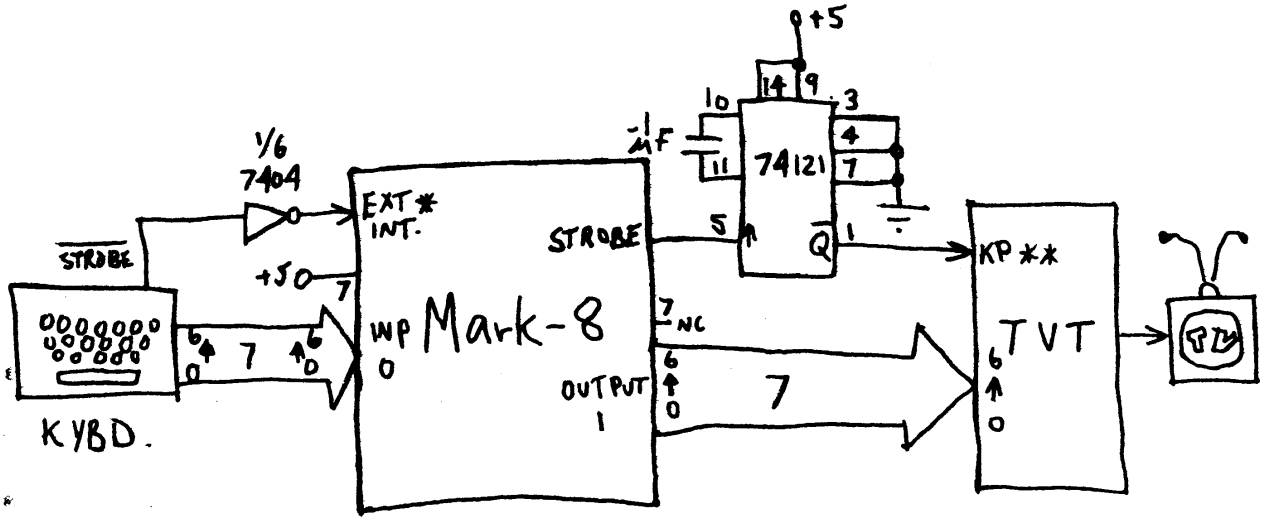
CHOMP!

By
Phil Mork
12 Woodland Road
Weston, MA 02193

Any number of players can play Chomp. It is played (in this version) on an 8 by 8 board of +'s with a * in the upper right hand corner. Players take turns chomping until one player is forced to take the poison *. To take a chomp, you type in the letter and number of one of the +'s. That +, and all of the +'s to the left and below disappear. No fair chomping empty space.

This version of Chomp uses the Mark-8 with the TV Typewriter I and an ASCII keyboard. The TVT is on output port 1, and the keyboard is on input port 0. Strobe lines are appropriately connected(see below).
First load the " Load Comments" program then interrupt with a Restart 005. Now set the switch register to 300 (NOP) and type in the comments using returns and line feeds as shown. The output 0 LED's will count characters as they are loaded. LED's should read 365 when done.

Now load the program from 0 000 to 0 164. Interrupt with 005, then set switch register to 300, home TVT and press any key. When the game is over, clear the screen and hit any key to play again. Have fun!



* Remove jumper!
** Remove cursor C16.

Phil Mork

CHOMP by Phil Mork April 21, 1975

Load Comments

```
1 000 066  LLI
  001 000
  002 056  LHI
  003 001
  004 306  LAL
  005 121  OUT 010
  006 000  HLT
  007 101  INP 000
  010 123  OUT 011
  011 370  LMA
  012 060  INL
  013 104  JMP
  014 004
  015 000
```

Comments

```
1 000   TYPE A LETTER AND A NUMBER(ret)
        TO TAKE A BITE. NO FAIR BITING(ret)
        AIR. BITE THE * AND YOU LOSE(3 ret)
        ABCDEFGH(ret)
        +++++++*1(ret)
        ++++++++2(ret)
        ++++++++3(ret)
        ++++++++4(ret)
        ++++++++5(ret)
        ++++++++6(ret)
        ++++++++7(ret)
        ++++++++8(7 ret)
        GO!(2 space) (LF) (space)

1 300   (6 ret)NEXT?(LF)

1 314   (ret)CHOMP! YOU LOSE. PLAY AGAIN?(11 ret) (LF)
```

-Program-

```
000 000 HLT
    066 LLI
    000
    106 CAL
    150
    000
    106 CAL
    117
010 000
    340 LEA
    074 CPI
    010 010
    150 JTZ
    102
    000
    106 CAL
020 117
    000
    320 LCA
    334 LDE
    016 LBI
    010 011
    006 LAI
    015 015
030 106 CAL
    121
    000
    006 LAI
    015 015
    106 CAL
    121
    000
040 011 DCB
    021 DCC
    110 JFZ
    033
    000
    006 LAI
    040 040
    106 CAL
050 121
    000
    041 DCE
    110 JFZ
    045
    000
    006 LAI
    015 015
060 106 CAL
    121
    000
    343 LED
    011 DCB
    110 JFZ
    045
    000
070 066 LLI
    300 300
    106 CAL
    150
    000
    104 JMP
    006
    000
100 -
    -
    106 CAL
    117
    000
    074 CPI
    001 001
    150 JTZ
110 140
    000
    104 JMP
    022
    000
    -
    -
    000 HLT
120 101 INP 001
    123 OUT 011
    044 NDI
    017 017
    056 LHI
    000 000
    051 DCH
    300 LAA
130 300 LAA
    300 LAA
    053 RTZ
    104 JMP
    126
    000
    -
    -
140 066 LLI
    314 314
    106 CAL
    150
    000
    005 RST
    -
    -
150 056 LHI
    001 001
    307 LAM
    074 CPI
    212 212
    053 RTZ
    106 CAL
    121
160 000
    060 INL
    104 JMP
    150
    000
```

Phil Mork's Music Program Modified For 8080's

By Chuck Leroy, 116 Somerset Pl
Lompoc, CA, 93436
(805)RE6-5975
(805)866-8995

MUSIC PROGRAM FOR ALTAIR 8800

Uses Sense Switches for Tempo

```
START   LXI H    MUSIC    SET ADDR.
TEMPO   IN       377      GET TEMPO FROM
                          SENSE SW.
        MOV D,A           PUT IN D
THERE   MOV A,M           GET NOTE
        CPI      377      377 ?
        JZ       START    YES, REPEAT
LOOP    DCR A             NO, DEC. FREQ.
        JZ       CLICK    0 ?
        DCR D             NO, DEC. TEMPO
        JNZ      LOOP     0 ?
        MOV B,A           YES, SAVE NOTE
        IN       377      GET TEMPO
        MOV D,A           PUT IN D
        MOV A,B           RESTORE NOTE
        DCR E             TIME TO GET NEW
                          NOTE ?
        JNZ      LOOP     NO, GO BACK
        INX H             YES, BUMP ADDR.
        JMP      THERE    GO BACK
CLICK   OUT      PORT     OUTPUT
        JMP      THERE    GO BACK
```

NOTE	VALUE
A	343
A#	326
B	312
MIDDLE C	277
C#	264
D	252
D#	240
E	230
F	217
F#	207
G	200
G#	174
A	162
A#	153
B	145
HIGH C	140
C#	132
D	125
D#	120
E	114
F	110
REPEAT	377

```
MUSIC   200   162   140   174
        230   162   162   174
        217   200   174   174
        207   200   162   174
        200   207   153   230
        114   200   145   230
        140   230   153   140
        200   217   145   145
        200   200   217   140
        217   162   217   145
        217   162   140   145
        230   174   140   145
        217   162   140   140
        217   125   140   145
        217   140   140   145
        217   140   230   162
        217   162   230   162
        264   200   140   207
        252   162   140   207
        230   145   140   252
        217   140   140   252
        125   140   145   377
        145   140   145
```

Try Sense Switch 11,12 for Tempo.

Handy Special Register Subroutines

By Dr. Robert Suding, C/O Digital Group, PO Box 6528, Denver, CO 80206

Register operations are a general nuisance on the 8008, especially when using the H&L registers. The following subroutines are part of a new 2K operating system to be available through the Digital Group.

The first thing to do is to make up two jumper plugs to connect the eight Port 5 inputs to the eight Port 5 outputs, and the eight Port 4 inputs to the eight Port 4 outputs.

The next item is to reserve storage addresses 000006, 000007, and 000050 - 000056 as temporary storage locations for registers A through L.

Now the subroutines (addresses may be moved as desired):

Notes

"H&L Register Save" places the current H&L into storage positions 000055 and 000056. The A register is temporarily saved and later restored to permit its utilization without loss of its original contents.

"H&L Register Restore" retrieves the values of H&L registers previously stored in storage positions 000055 and 000056.

"H&L Swap with D&E" exchanges these register sets to double the memory accessing capabilities of the 8008.

"Register A - L Save" places the current A - L registers into storage positions 000050 - 000056. No registers are lost in the operation. By placing this subroutine at the front of your storage dump routine, you can list off all 6 registers by simply sampling storage positions 000050 - 000056.

"Restore A - L Registers" loads registers A - L with the contents of storage positions 000050 - 000056. The former data in registers A - L is lost.

"Swap Current A - L Registers with Stored Ones" exchanges the current A - L Registers with those stored in storage positions 000050 - 000056. No data is lost in the exchange. The result of this operation is a 12 register microprocessor instead of a 6 register microprocessor.

Sincerely,

Robert

Dr. Robert Suding WØLMD

PROGRAM: SPECIAL REGISTER SUBROUTINES

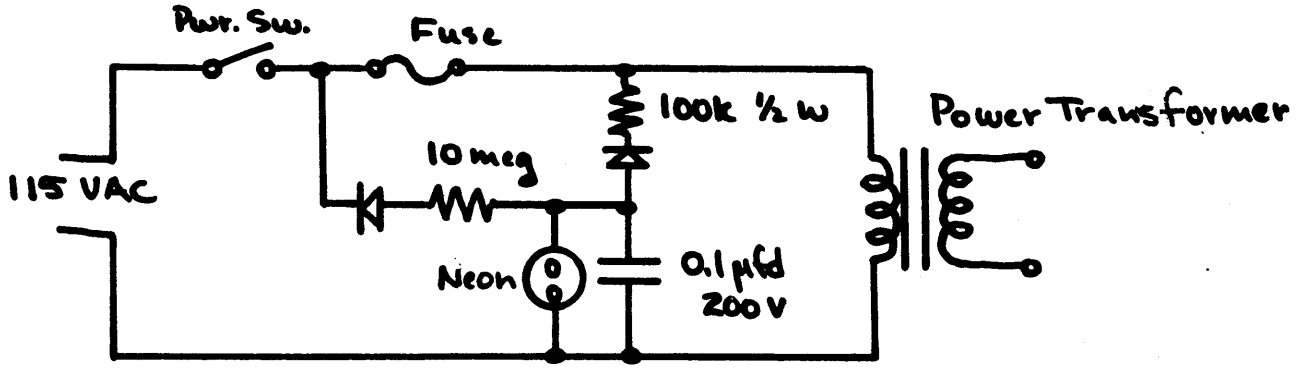
OCTAL ADDRESS	OCTAL CODE	OPERATION
001 000	***	H&L Register Save
001 001	133	Out 5 (Save A)
001 002	305	Load A with H
001 003	131	Out 4 (Save H)
001 004	306	Load A with L
001 005	056	Load H with 000
001 006	000	
001 007	066	Load L with 056
001 010	056	
001 011	370	Load Mem with A
001 012	061	Decrement L
001 013	111	In 4 (Retrieve H)
001 014	370	Load Mem with A
001 015	113	In 5 (Restore A)
001 016	007	Return Uncond.
001 017		
001 020		
001 021	***	H&L Register Restore
001 022	133	Out 5 (Save A)
001 023	056	Load H with 000
001 024	000	
001 025	066	Load L with 055
001 026	055	
001 027	307	Load A with Mem
001 030	131	Out 4 (Save H)
001 031	060	Increment L
001 032	367	Load L with Mem
001 033	111	In 4 (Retrieve H)
001 034	350	Load H with A
001 035	113	In 5 (Restore A)
001 036	007	Return
001 037		
001 040	***	H&L Swap with D&E
001 041	133	Out 5 (Save A)
001 042	305	Load A with H
001 043	353	Load H with D
001 044	330	Load D with A
001 045	306	Load A with L
001 046	364	Load L with E
001 047	340	Load E with A
001 050	113	In 5 (Restore A)
001 051	007	Return
001 052		
001 053		
001 054	***	Register A-L Save
001 055	133	Out 5 (Save A)
001 056	305	Load A with H
001 057	131	Out 4 (Save H)
001 060	306	Load A with L
001 061	056	Load H with 000
001 062	000	
001 063	066	Load L with 056
001 064	056	
001 065	370	Load Mem with A
001 066	061	Decrement L
001 067	111	Input 4 (Retrieve H)
001 070	370	Load Mem with A
001 071	061	Decrement L
001 072	374	Load Mem with E
001 073	061	Decrement L
001 074	373	Load Mem with D
001 075	061	Decrement L
001 076	372	Load Mem with C
001 077	061	Decrement L
001 100	371	Load Mem with B
001 101	061	Decrement L
001 102	113	Input 5 (Retrieve A)
001 103	370	Load Mem with A
001 104	007	Return
001 105		
001 106		
001 107	***	Restore A-L Registers
001 110	056	Load H with 000
001 111	000	
001 112	066	Load L with 050
001 113	050	
001 114	307	Load A with Mem
001 115	133	Out 5
001 116	060	Increment L
001 117	317	Load B with Mem
001 120	060	Increment L
001 121	327	Load C with Mem
001 122	060	Increment L
001 123	337	Load D with Mem
001 124	060	Increment L
001 125	347	Load E with Mem
001 126	060	Increment L
001 127	307	Load A with Mem
001 130	131	Out 4 (Save H)
001 131	060	Increment L
001 132	367	Load L with Mem
001 133	111	In 4 (Retrieve H)
001 134	350	Load H with A
001 135	113	In 5
001 136	007	Return
001 137		

Continued

PROGRAM: SPECIAL REGISTER SUBROUTINES

OCTAL ADDRESS	OCTAL CODE	OPERATION
001 140	***	Swap Current A-L
001 141		Regs with Saved Ones
001 142	133	Out 5 (Save A)
001 143	305	Load A with H
001 144	131	Out 4 (Save H)
001 145	056	Load H with 000
001 146	000	
001 147	306	Load A with L
001 150	066	Load L with 007
001 151	007	
001 152	370	Store A
001 153	066	Load L with 050
001 154	050	
001 155	307	Load A with Mem
001 156	066	Load L with 006
001 157	006	
001 160	370	Store A
001 161	066	Load L with 050
001 162	050	
001 163	113	In 5 (Retrieve A)
001 164	370	Store A
001 165	066	Load L with 006
001 166	006	
001 167	307	Load A with Mem
001 170	133	Out 5
001 171	301	Load A with B
001 172	066	Load L with 051
001 173	051	
001 174	317	Load B with Mem
001 175	370	Store A
001 176	302	Load A with C
001 177	060	Increment L
001 200	327	Load C with Mem
001 201	370	Store A
001 202	303	Load A with D
001 203	060	Increment L
001 204	337	Load D with Mem
001 205	370	Store A
001 206	304	Load A with E
001 207	060	Increment L
001 210	347	Load E with Mem
001 211	370	Store A
001 212	060	Increment L
001 213	307	Load A with Mem
001 214	066	Load L with 006
001 215	006	
001 216	370	Store A
001 217	111	In 4 (Retrieve H)
001 220	066	Load L with 055
001 221	055	
001 222	370	Store A
001 223	060	Increment L
001 224	307	Load A with Mem
001 225	131	Out 4 (Save L)
001 226	066	Load L with 007
001 227	007	
001 230	307	Load A with Mem
001 231	066	Load L with 056
001 232	056	
001 233	370	Store A
001 234	066	Load L with 006
001 235	006	
001 236	357	Load H with Mem
001 237	111	In 4 (Retrieve L)
001 240	360	Load L with A
001 241	113	In 5 (Retrieve A)
001 242	007	Return

PILOT LIGHT & BLOWN FUSE INDICATOR CIRCUIT 5/4/75



If fuse is good and power is one, neon lights all the time. If fuse blows, lamp flashes.

By Ted Lincoln WA6HWJ
410 Bell Avenue, Santa Ana, CA 92707

MEMORY DIAGNOSTIC

JAMES R. BODDIE
APT 216
920 N. DEAN RD.
AUBURN, AL 36830

0	056	LHI	
1	PPP	PPP	PAGE UNDER TEST (NOT SAME PAGE THAT PROG. IS LOADED)
2	066	LLI	
3	000	000	
4	016	LBI	
5	TTT	TTT	TEST PATTERN
6	376	LML	WRITE IN MEM.
7	060	INL	
10	110	JFΦ	CONTINUE IF PAGE
11	006	006	NOT FILLED
12	000	000	
13	307	LAM	READ FROM MEMORY
14	276	CML	COMPARE WITH PATTERN
15	110	FFΦ	JUMP IF DIFFERENT
16	027	027	
17	000	000	
20	060	INL	
21	110	JFΦ	CONTINUE IF PAGE
22	013	013	NOT COMPLETELY
23	000	000	CHECKED
24	104	JMP	DO IT AGAIN
25	000	000	
26	000	000	
27	121	OUTΦ	OUTPUT WRONG PATTERN
30	000	HLT	READ FROM MEM.
31	306	LAL	
32	121	OUTΦ	OUTPUT ADDRESS OF ERROR
33	000	HLT	
34	104	JMP	CONTINUE
35	020	020	
36	000	000	

- PROG. LOADS MEMORY ADD. INTO MEM. LOCATION THEN READS FOR ERROR.
- FOR AN ARBITRARY TEST PATTERN
  1. PUT PATTERN IN (5)
  2. CHANGE (6) TO 371
  3. CHANGE (14) TO 271

THE IDEA OF CHECKING THE MEMORY ADDRESS CATCHES BEFORE PLUGGING THE 8008 IN IS GOOD, BUT I FOUND IT NECESSARY TO CLEAR THE R/W FF (½ IC 14) BY MOMENTARILY GROUNDING PIN 14 ON THE EMPTY 8008 SOCKET.

SINCERELY, James R. Boddie

PROGRAM TITLE MEMTEST 1101 NO. 1 A, B, C, D Page 1 of 2

No.		Code	Key
000	056	LHI	Load H Immediate
1	001	DATA,	00 000 001
2	066	LLI	Load L Immediate
3	000	DATA,	00 000 000
4	016	LBI	Load B Immediate
5	377	DATA	11 111 111
6	026	LCI	Load C Immediate
7	000	DATA	00 000 000
010	036	LDI	Load D Immediate
11	377	DATA	11 111 111
12	104	JMP	Uncond. Jump to
13	016	ADDRESS	Start AC, 00 001 110
14	000		—
15	060	Loop Ø, INL	Increment L = L+1
16	302	Start AC, LAC	Load A ≤ C
17	370	LMA	Load M ≤ A
020	301	LAB	Load A ≤ B
21	276	CPL	Compare A ≤ L
22	110	JFZ	Jump False Zero to
23	015	ADDRESS	Loop Ø INL
24	000		—
25	056	LHI	Load H Immediate
26	001	DATA	00 000 001
27	066	LLI	Load L Immediate
030	000	DATA	00 000 000
31	104	JMP	Uncond. Jump to
32	035	ADDRESS,	Read A, C, 00 011 101
33	000		—
34	060	Loop 1, INL	Increment L = L+1
35	306	Read A, C, LAL	Load A ≤ L
36	121	OUT/	Output A to Port Ø
037	307	LAM	Load A ≤ M

No.		Code	Key
040	272	CPC	Compare A ≤ C
41	110	JFZ	Jump on False Zero
42	117	ADDRESS	to- BAD 01 001 111
43	000		00 000 000
44	301	LAB	Load A ≤ B
45	276	CPL	Compare A ≤ L
46	110	JFZ	Jump on False Zero to
47	034	ADDRESS	Loop 1, INL
050	000		—
51	006	LAI	Load A Immediate
52	000	DATA	00 000 000
53	121	OUT/ø	Output A to Port Ø
54	000	Test Passed HLT	Halt - 300/INT to Cont.
55	056	LHI	Load H Immediate
56	001	DATA	00 000 001
57	066	LLI	Load L Immediate
060	000	DATA	00 000 000
61	104	JMP	Uncond. Jump to
62	065	ADDRESS	Start B, D, 00 110 101
63	000		—
64	060	Loop 2, INL	Increment L = L+1
65	306	Start B, D LAL	Load A ≤ L
66	121	OUT/ø	Output A to Port 0
67	373	LMD	Load M ≤ D
070	307	LAM	Load A ≤ M
71	273	CPD	Compare A ≤ D
72	110	JFZ	Jump on False Zero to
73	117	ADDRESS,	Bad 01 001 111
74	000		—
75	372	LMC	Load M ≤ C
76	301	LAB	Load A ≤ B
077	276	CPL	Compare A ≤ L

Remarks: START WITH A RST-0 (005/INT)
END OF 0's CHECK INDICATED BY ALL 0's DISPLAYED AT PORT Ø
CONTINUE WITH A CONT (300/INT)
END OF 1's WALK THROUGH INDICATED BY ALL 1's AT PORT Ø - INT TO CONTINUE
END OF 1's CHECK INDICATED BY ALL 0's AT PORT Ø - INT (300) TO CONT.
END OF 0's WALK THROUGH INDICATED BY ALL 1's AT PORT Ø

(Use reverse side for formulas, flow charts, notes, etc.)

M. PAUL FARR
Printed in U.S.A.
700-0715
1-73-2M

PROGRAM TITLE MEMTEST 1101 NO. 1 A, [redacted], D Page 2 of 2

No.		Code	Key
100	110	JFZ	JUMP ON FALSE ZERO TO
101	069	ADDRESS	LOOP 2 00 110 100
02	000		—
03	000	TEST PASSED, HLT	HALT - 300 INT TO CONT.
04	056	LHI	LOAD H IMMEDIATE
05	001	DATA	00 000 001
06	066	LLI	LOAD L IMMEDIATE
07	000	DATA	00 000 001
110	026	LCI	LOAD C IMMEDIATE
11	377	DATA	11 111 111
12	036	LDI	LOAD D IMMEDIATE
13	000	DATA	00 000 000
14	104	JMP	UNCONDIT. JUMP TO
15	016	ADDRESS	START A, C, 00 001 110
16	000		—
10_{10}	117_8	000 HLT	BAD - DEFECTIVE
		1101 AT ADDRESS DISPLAYED PORT O	

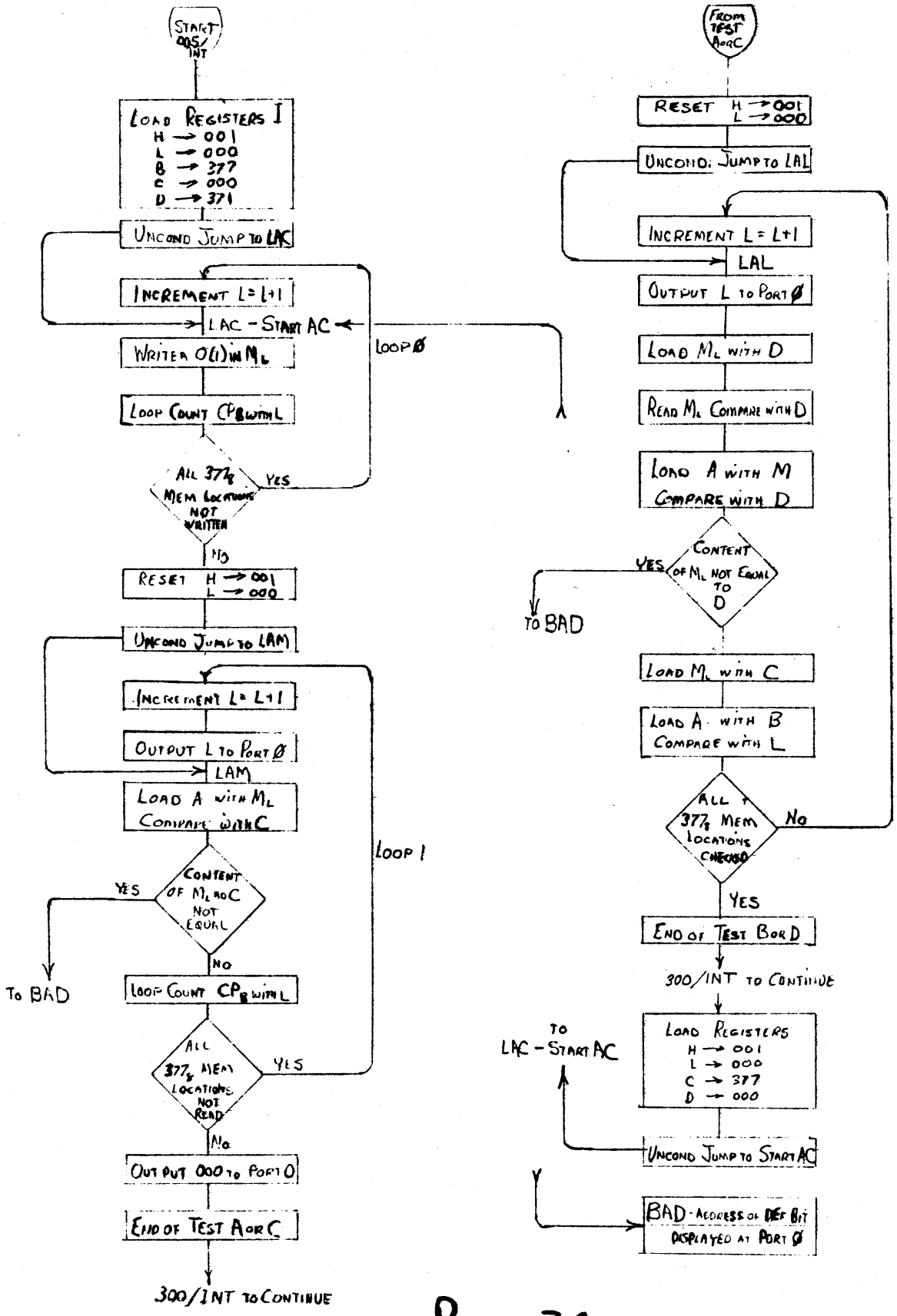
No.		Code	Key

Remarks: IF AT ANY POINT IN THE TEST A ERROR IS FOUND IN THE CONTENTS OF A MEMORY LOCATION, THE PROGRAM WILL EXIT TO "BAD" INDICATED BY THE LOW ADDRESS DISPLAY OF 117_8 (01 001 111). THE ADDRESS OF THE "DEFECTIVE BIT" WILL BE DISPLAYED AT OUTPUT PORT Ø ON CONTROL PANEL.

(Use reverse side for formulas, flow charts, notes, etc.)

MEMTEST 11C1 #1 A, B, C, D

FLOW CHART



M PAUL FARR

A SHORT PROGRAM TO ENTER, DISPLAY, AND STORE ASCII TEXT

By M. Paul Farr, 3723 Jackstadt, San Pedro, CA 90731

Note: See TV Typewriter interface in NL #5.

Address	OP Code	Mnemonic	Descrip.
000	101	INP-0	Input Char.
1	123	OUT-A	Echo To TVT
2	370	LMA	Load To Mem
3	060	INL	Inc Add Low
4	000	HLT	Halt
5	056	LHI	Load Addr High
6	001	001	Page 001
7	066	LLI	Load Addr Low
010	000	000	Loc. 000
1	307	LAM	Load A with M
2	106	CAL	Call Out Subr.
3	040	Output	
4	000	Subr.	
5	060	INL	Incr. Add Low
6	006	LAI	Load A Immed.
7	377	377	11111111
020	276	CPL	Compare A With L
1	150	JTZ	Jmp True Zero
2	004	Start	To Start
3	000		
4	104	JMP	Jump False Zero
5	012	Next	To Next Char.
6	000	Char.	

Output Subroutine
(25 Char./Sec. Delay Loop)

040	123	OUT-A
1	026	LCI
2	003	003
3	031	DCD
4	220	JFZ
5	043	Loop 1
6	000	
7	031	DCC
050	110	JFZ
1	043	Loop 2
2	000	
3	007	RET

Keyboard Octal Loader -- By Gregg Weber, 1000 Plaza Dr. Apt 311-C State College, PA 16801

This is a copy of the loader program he has been using. It loads programs in octal from the keyboard, dumps programs in octal on the TVT, and executes programs in memory. He will soon add cassette load and dump routines.

Directions For Octal Loader

1. TVT connected to output port B (125)
2. Keyboard connected to Input port 0
3. Start with 005
4. Change interrupt instruction to 300 continue
5. Operating instructions.

Program should type *
Example- to load a program starting at 02 000
Type L.
Program should respond with H=
Type 002
Program should respond with L=
Type 000
Program should respond with 02 000
Type contents of 02 000
Program should respond with 02 001
When finished type F
Program should respond with *
To dump memory ,type D and then enter address as before.
Program will dump 60 locations in octal.
To execute a program, type E, and enter address as before.
An incorrect command will result in a ? being typed.

OCTAL LOADER

Label	Address	Code	Mne.
	00000	104	JMP START
	00001	313	
	00002	000	
KBD	00003	000	HET
	00004	101	INP0
	00005	310	LBA
OUT	00006	301	LAB
	00007	125	OUT 3
	00010	036	LDI
	00011	003	
	00012	046	LEI
	00013	163	
LOOP	00014	041	DCE
	00015	110	JFZ LOOP
	00016	014	
	00017	000	
	00020	031	DCD
	00021	110	JFZ LOOP
	00022	014	
	00023	000	
	00024	007	RTN
BINOCT	00025	066	LLI
	00026	122	
	00027	301	LAB
	00030	044	NDI
	00031	007	
	00032	004	ADI
	00033	060	
	00034	370	LMA
	00035	061	DCL
	00036	301	LAB
	00037	044	DDI
	00040	070	
	00041	012	RRC
	00042	012	RRC
	00043	012	RRC
	00044	004	ADI
	00045	060	
	00046	370	LMA
	00047	061	DCL
	00050	301	LAB
	00051	002	RLC
	00052	002	RLC
	00053	044	NDI
	00054	003	
	00055	004	ADI
	00056	060	
	00057	370	LMA
	00060	007	RTN

Gregg Weber's Keyboard Loader Continued

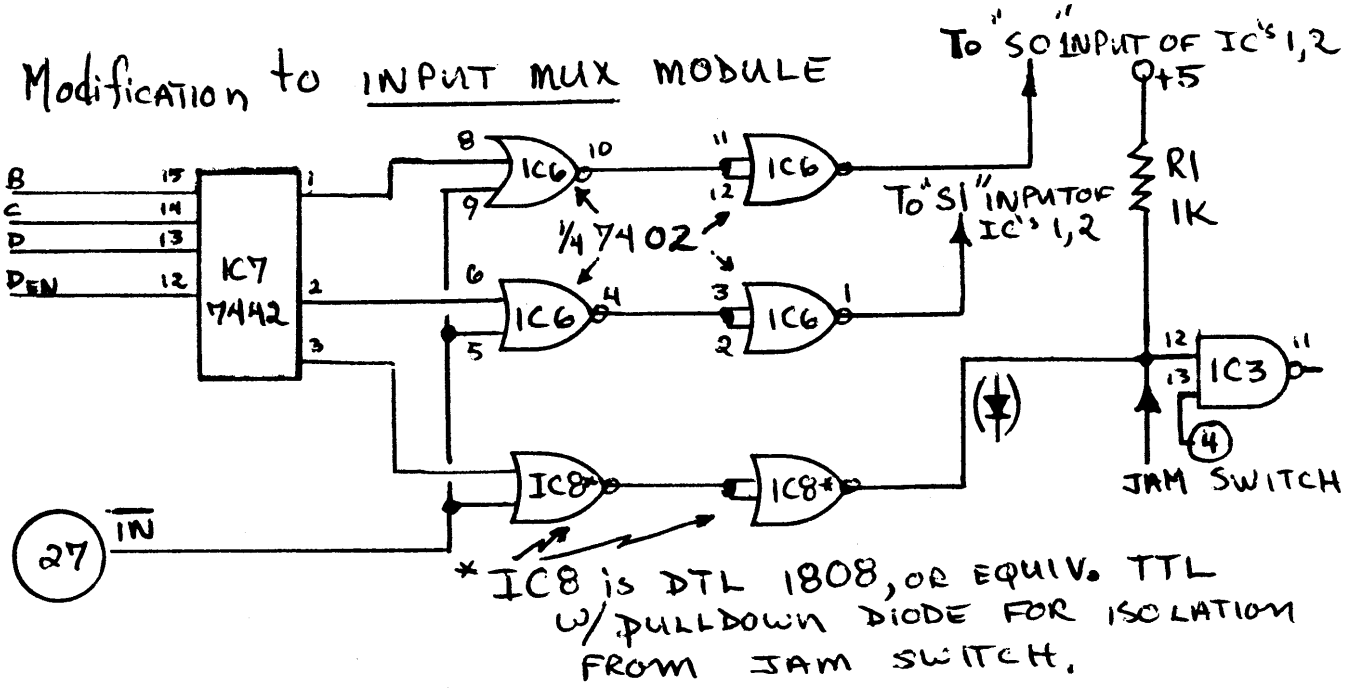
Label	Address	Code	Mne.
OCTBIN	00061	066	LLI
	00062	120	
	00063	307	LAM
	00064	024	SUI
	00065	060	
	00066	002	RLC
	00067	002	RLC
	00070	002	RLC
	00071	310	LBA
	00072	060	INL
	00073	307	LAM
	00074	024	SUI
	00075	060	
	00076	201	ADB
	00077	002	RLC
	00100	002	RLC
	00101	002	RLC
	00102	310	LBA
	00103	060	INL
	00104	307	LAM
	00105	024	SUI
	00106	060	
	00107	201	ADB
	00110	310	LBA
	00111	007	RTN
DATAIN	00112	026	LCI
	00113	375	
	00114	066	LLI
	00115	120	
IN	00116	106	CAL KBD
	00117	003	
	00120	000	
	00121	371	LMB
	00122	006	LAI
	00123	106	'F'
	00124	271	CPB
	00125	150	JTZ START
	00126	313	
	00127	000	
	00130	060	INL
	00131	020	INC
	00132	110	JFZ IN
	00133	116	
	00134	000	
	00135	106	CAL OCTBIN
	00136	061	
	00137	000	
	00140	007	RTN
ENTERA	00141	106	CAL CR

Label	Address	Code	Mne.
	00142	070	
	00143	001	
	00144	016	LBI
	00145	110	'H'
	00146	106	CAL OUT
	00147	005	
	00150	000	
	00151	016	LBI
	00152	075	'='
	00153	106	CAL OUT
	00154	006	
	00155	000	
	00156	106	CAL DATAIN
	00157	112	
	00160	000	
	00161	066	LLI
	00162	124	
	00163	371	LMB
	00164	016	LBI
	00165	114	'L'
	00166	106	CAL OUT
	00167	006	
	00170	000	
	00171	016	LBI
	00172	075	'='
	00173	106	CAL OUT
	00174	006	
	00175	000	
	00176	106	CAL DATAIN
	00177	112	
	00200	000	
	00201	066	LLI
	00202	123	
	00203	371	LMB
	00204	007	RTN
	00205		NOP
	00206		NOP
ADDOUT	00207	106	CAL CR
	00210	070	
	00211	001	
	00212	066	LLI
	00213	124	
	00214	317	LBM
	00215	106	CAL BINOCT
	00216	025	
	00217	000	
	00220	066	LLI
	00221	121	
	00222	317	LBM
	00223	106	CAL OUT
	00224	006	
	00225	000	
	00226	060	INL
	00227	317	LBM
	00230	106	CAL OUT
	00231	006	
	00232	000	
	00233	066	LLI
	00234	123	
	00235	317	LBM
	00236	106	CAL BINOCT
	00237	025	
	00240	000	
	00241	106	CAL DATOUT
	00242	267	
	00243	000	
	00244	106	CAL SP
	00245	076	
	00246	001	
	00247	007	RTN
	00250		NOP
	00251		NOP
	00252		NOP
	00253		NOP
	00254		NOP
	00255		NOP
WDPRIN	00256	106	CALL SETMA
	00257	002	
	00260	001	
	00261	317	LBM
	00262	056	LHI
	00263	001	
	00264	106	CAL BINOCT
	00265	025	
	00266	000	
DATOUT	00267	106	CAL SP
	00270	076	
	00271	001	
	00272	026	LCI
	00273	375	
	00274	066	LLI
	00275	120	
BOUT	00276	317	LBM
	00277	106	CAL OUT
	00300	006	
	00301	000	
	00302	060	INL
	00303	020	INC
	00304	110	JFZ BOUT
	00305	276	
	00306	000	
	00307	007	RTN
	00310		NOP
	00311		NOP
	00312		NOP
START	00313	106	CAL CR
	00314	070	
	00315	001	
	00316	016	LBI
	00317	052	'*'
	00320	106	CAL OUT
	00321	006	

Label	Address	Code	Mne.
	00322	000	
	00323	106	CAL KBD
	00324	003	
	00325	000	
	00326	056	LHI
	00327	001	
	00330	301	LAB
	00331	074	CPI
	00332	114	'L'
	00333	150	JTZ DATA
	00334	360	
	00335	000	
	00336	074	CPI
	00337	104	'D'
	00340	150	JTZ DUMP
	00341	024	
	00342	001	
	00343	074	CPI
	00344	105	'E'
	00345	150	JTZ EXEC
	00346	104	
	00347	001	
ERROR	00350	016	LBI
	00351	077	'?'
	00352	106	CAL OUT
	00353	006	
	00354	000	
	00355	104	JMP START
	00356	313	
	00357	000	
DATA	00360	106	CAL ENTERA
	00361	141	
	00362	000	
READIN	00363	106	CAL ADDOUT
	00364	207	
	00365	000	
	00366	106	CAL DATAIN
	00367	112	
	00370	000	
	00371	106	CAL SETMA
	00372	002	
	00373	001	
	00374	371	LMB
	00375	056	LHI
	00376	001	
	00377	104	JMP READIN
	01000	363	
	01001	000	
SETMA	01002	066	LLI
	01003	124	
	01004	337	LDM
	01005	061	DCL
	01006	347	LEM
	01007	324	LCE
	01010	020	INC
	01011	372	LMC
	01012	110	JFZ HIGH
	01013	021	
	01014	001	
	01015	323	LCD
	01016	020	INC
	01017	060	INL
	01020	372	LMC
HIGH	01021	353	LHD
	01022	364	LLE
	01023	007	RTN
DUMP	01024	106	CAL ENTERA
	01025	141	
	01026	000	
	01027	066	LLI
	01030	116	
	01031	076	LMI
	01032	012	
NEWLIN	01033	106	CAL ADDOUT
	01034	207	
	01035	000	
	01036	066	LLI
	01037	117	
	01040	076	LMI
	01041	006	
LINE	01042	106	CAL WDOUT
	01043	256	
	01044	000	
	01045	066	LLI
	01046	117	
	01047	327	LCM
	01050	021	DCC
	01051	372	LMC
	01052	110	JFZ LINE
	01053	042	
	01054	001	
	01055	066	LLI
	01056	116	
	01057	327	LCM
	01060	021	DCC
	01061	372	LMC
	01062	110	JFZ NEWLIN
	01063	033	
	01064	001	
	01065	104	JMP START
	01066	313	
	01067	000	
CR	01070	016	LBI
	01071	015	'CR'
	01072	106	CAL OUT
	01073	006	
	01074	000	
	01075	007	RTN
SP	01076	016	LBI
	01077	040	'ß'
	01100	106	CAL OUT
	01101	006	
	01102	000	

Gregg Weber's Keyboard Loader
Continued

```
Label   Address   Code   Mne.
        01103     007    RTN
KEC     01104     106    CAL ENTERA
        01105     141
        01106     000
        01107     066    LLI
        01110     122
        01111     076    LMI
        01112     104
        01113     104    JMP DATA3
        01114     122
        01115     003
        01116            USED BY LOADER
        01117            USED BY LOADER
ATA1    01120            DATA1 USED BY LOADER
ATA2    01121            DATA2 USED BY LOADER
ATA3    01122            DATA3 USED BY LOADER
        01123            USED BY LOADER
        01124            USED BY LOADER
```



THIS MOD. CAUSES INPUT INSTRUCTION "105" TO INPUT DATA FROM THE INTERRUPT INSTRUCTION PORT. THE ADDITION OF IC 8 (AND POSSIBLY A DIODE) ARE THE ONLY MODIFICATIONS NEEDED. (TO THE MARK 8)

By Dave Bowles

TERRY RITTER'S EXECUTIVE-LOADER TTY DUMP SYSTEM
(Note: See Terry's writeup on this in NL #6)

By - Terry Ritter, 2524 Glen Springs Way, Austin, TX 78741
(512) 441-0036

Only One Restart Location Is Used

```
00 000 104   Restart - Jump To Executive
     1 000   Loader
     2 004
     3 106   Executive - Modified
     4 000   Instructions
     5 007
     6 300
     7 007
```

Notes:
Uses Keyboard-Strobe
No-Op Interrupt

Any input which is not a command is considered data; is masked and three bits shifted into display from rt.

```
04 000 250
     1 320
     2 121
     3 000
     4 101   (KEYBOARD PORT)
     5 054
     6 377
     7 310
    10 056
    11 004   OP TABLE LOCATION
    12 066
    13 045
    14 301
    15 277
    16 150
    17 075
    20 004
    21 060
    22 060
    23 306
    24 074
    25 074
    26 140
    27 014
    30 004   OP TABLE LOOKUP
    31 301
    32 044
    33 007
    34 310
    35 302
    36 200
    37 100
    40 200
    41 261
    42 104
    43 001
    44 004
    45 050   ASCII H = DISPLAY H (On Port of Display)
    46 305
    47 054   ASCII L = DISPLAY L
```

Op Match - Found

Op Match - Found

```
04 050 306
    51 055   ASCII M = DISPLAY M
    52 307
    53 030   ASCII 8 = LOAD H FROM DISPLAY
    54 352
    55 031   ASCII 9 = LOAD L FROM DISPLAY
    56 362
    57 016   ASCII - = LOAD M "
    60 372
    61 010   ASCII Space—Examine, Increment H,L & Display new M
    62 164
    63 007   ASCII Backspace = Examine Backwards
    64 170
    65 222   PRINT BUTTON = Jump To TTY Dump (Beg At H,L)
    66 200
    67 036
    70 036   ASCII ^ = Call Sub (at H,L)
    71 015
    72 175   Non Implemented Commands
    73 013
    74 000
    75 060
    76 317
    77 306
   100 056
     1 000
     2 066
     3 004
     4 074
     5 061
     6 100
     7 124   Non Single Byte
    10 004
    11 076
    12 007
    13 060
    14 076
    15 000
    16 060
    17 371
```

Single Byte Instr.

```
04 120 302   Single Byte Instr.
   21 104
   22 146
   23 004
   24 074
   25 070
   26 150
   27 136
   30 004
   31 006
   32 004   Rom-Subr. Instr.
   33 104
   34 140
   35 004
   36 303   Any Sub Instr.
   37 314
   40 371
   41 060
   42 370
   43 060   Prepare (Modify) RAM
   44 076
   45 307
   46 353
   47 364
   50 106
   51 003   => To RAM Subr.
   52 000
   53 335
   54 346
   55 104
   56 002   Start Again
   57 004
   60 104
   61 000
   62 000
   63 007
   64 060
   65 013   Incr. H,L. Subr.
   66 050
   67 007
   70 060
   71 061
   72 110   Decr. H,L. Subr.
   73 176
   74 004
   75 051
   76 061
 177 007   End of Exec.-Loader System
 ---------------------------------------
 200 006   Beginning of ROM TTY Dump system
 201 013   — Baudot CR
 202 106
 203 350   => TTY Output
 204 004
 205 006
 206 157   — Baudot Fig's.
 207 106

 04 210 350   => TTY Output
    211 004
    212 006
    213 043   — Baudot LF
    214 106
    215 350   => TTY Output
    216 004
    217 313
    220 106
    221 276   => TTY 2-Digit
    222 004   => Translation & Output
    223 314
    224 106
    225 260   => TTY 3-Digit
    226 004   => Translation & Output
    227 006
    230 023   — Baudot Space
    231 106
    232 350   => TTY Output
    233 004
    234 353
    235 364
    236 317
    237 300   Reserved For Future
    240 300   Interpreter
    241 300
    242 106
    243 260   => TTY 3-Digit
    244 004   => Translation
    245 106   => & Output
    246 254   =>
    247 004
    250 110
    251 200   Start Again
    252 004
    253 007   —
    254 040
    255 013   Incr. D,E
    256 030
    257 007
 ---------------------------------------
    260 056   Byte => Baudot Translation
    261 004
    262 301
    263 044   Mask, Shift,
    264 300   Pick Up Baudot
    265 002
    266 002
    267 004
    270 335
    271 360
    272 307
    273 106
    274 350   => TTY Output
    275 004
    276 056
    277 004
```

```
04 300 301
   301 044
   302 070
   303 012
   304 012
   305 012
   306 004
   307 335
   310 360
   311 307
   312 106
   313 350
   314 004
   315 301
   316 044
   317 007
   320 004
   321 335
   322 360
   323 307
   324 106
   325 350
   326 004
   327 006
   330 023
   331 106
   332 350
   333 004
   334 017
   335 067
   336 167
   337 147
   340 103
   341 053
   342 007
   343 127
   344 163
   345 063
   346 016
   347 037
   350 121
   351 131
   352 026
   353 330
   354 300
   355 300
   356 300
   357 021
   360 110
   361 355
   362 004
   363 200
   364 110
   365 350
   366 004
   367 007
```

Mask Shift Pick up Baudot

TTY Output

mask pick up Baudot

TTY Output

Baudot Space

TTY Output

Baudot Octal Table

Bit Timing

Serial Output Loop

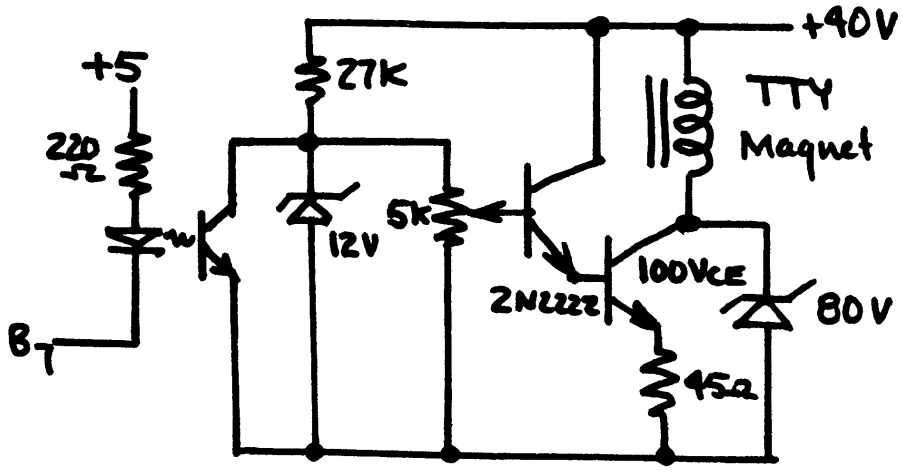
```
04 370 104
   371 000
   372 000
   373 000
   374 100
   375 000
   376 000
   377 000
```

Output To TTY B_7 of Port 4
(Also on port 0 for effect)

Extra delay step included for faster clocked 8008's.

Isolated Magnet-Driver

(constant-current design insures fast attack and adjustable current; zener protects transistor and insures fast decay. Inductance in circuit requires high voltage for performance comparable to 120 volt systems)



Terry Ritter, 2524B Glen Springs Way, Austin, TX 78741 (512) 441-0036 suggests the following software standard:

On another topic, I propose some software possibilities which might become standards: It may not be all that apparent, at first, but an 8008 machine-language program will run only when the program is located in the memory locations for which it was written. There is no particular problem in loading the program anywhere desired; the problem is changing the jump addresses for the program to correspond to the new location.

I propose that the present or original location of each program be identified by a jump as the program's first step (see figure 1.). Additional space just after the jump address can be used as program ID bytes (see figure 2.), thus providing a convenient basis for program labeling and starting-address table-building programs. Note that the unconditional jump utilizes one of the 8008 "don't care" codes which can be easily identified by the relocatable loader as a "start of new program." Similarly, the last step of each program should be a special RETURN code which provides indication of the last step of program(s) in which all proceeding steps to the start of the program are to be located sequentially together.

Note also that a RETURN last step is standardized, rather than a HALT. The RETURN allows calling each program from a keyboard-controlled monitor program, then returning control to the monitor when the called program is complete.

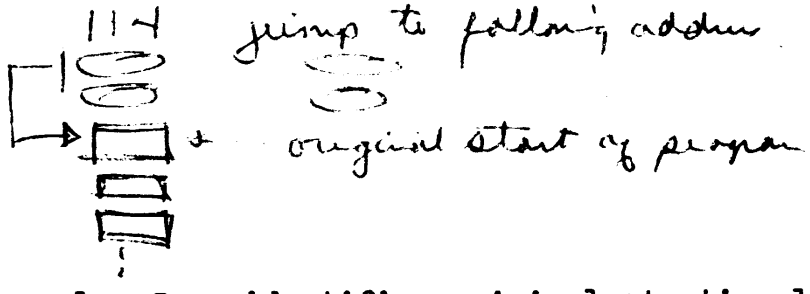


Figure 1. Jump identifies original starting location.

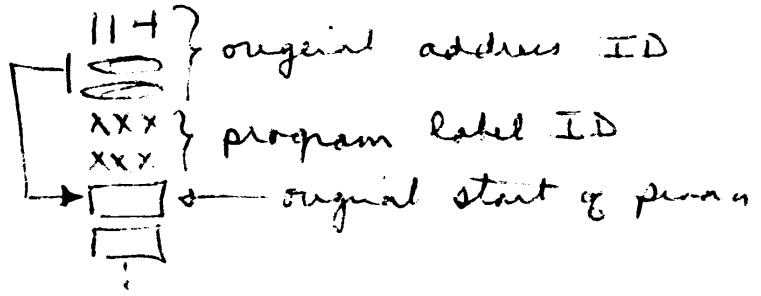


Figure 2. Program labels included.

Cordially

Terry F. Ritter
Vice President

PROPOSAL FOR UNIFYING INPUT/OUTPUT METHODS FOR 8008 AND 8080 USERS

By Brion Johnson
11 April 1975

1. There has been much discussion lately concerning a standard that would enable the ready exchange of programs between different systems. This would be especially good because the different essential programs on a system are much the same in nature but a lot of work to generate if a person starts from scratch. This proposal is aimed at those using INTEL 8008 or 8080 based systems, such as the MARK-8, MIL MOD-8, and ALTAIR 8800 to name a few, with a goal of making programs standardized to this proposal runable on any 8008 or 8080 system equipped with software as stated in this proposal.

2. A previous proposal has suggested that this standardization take place at a hardware level, by making specific I/O port allocations when the architecture is firmed up. This proposal does not use that approach because invariable the I/O configurations of every person's system is bound to be different due to personal choice, or pocketbook, or any number of other reasons, and also because the I/O structure of the 8008 differs radically from the I/O structure of the 8080.

3. The proposal is that program input/output be handled on a system level, which is the usual way that I/O is handled on most computers. Two elements are required, an IOCS (Input Output Control System - The term refers usually to a specific program that takes care of I/O responsibilities) and an exact format specification for calling on the IOCS to inform it of its task (here handled as a subroutine call).

4. The IOCS must (sorry) be written to fit the machine on which it will run. There is a bright side, though, as it may be the bare essentials and only take up about 40 to 50 locations or perhaps one may want to expand it to include such features as buffering, multi-level priority interrupt, usage with a comprehensive operating system supervisor, etc. Given time and sufficient interest, a typical small IOCS (bare bones) might be developed and published in this NL. This one might take and adapt as necessary to fit one's own system.

5. The IOCS proposed here works as follows; The program desiring an I/O service must tell the IOCS (A) The location or starting address of the data, (B) The number of 8 bit words to be transferred, (C) The format that the program looks at (the current format - binary, decimal, ASCII, etc - for outgoing data, or the format that incoming data is to be placed in), and (D) The device at which the operation is to be performed. When the IOCS receives this information, it proceeds with all of the housekeeping (is the device servicable, or is it busy, etc.) and gets everything set up to perform the I/O. Then it might go ahead and do the operation or if it is sophisticated enough, set up the interrupt system and return to the main program, bouncing back to send or receive the next word of data when the device signals that it is ready by causing an interrupt. The beauty of this is that both approaches "look" the same to the program, and hence the program may easily run on many different systems.

6. The format for calling the IOCS is as follows:

6.1 The A, B, C, and D registers contain data as follows:

6.1.1 The A register contains the lowest address of the block of data to be transferred.

6.1.2 The B register contains the number of 8 bit words to be transferred.

6.1.3 The C register contains the data format as follows:

D 7	D 6	D 5	D 4	D 3	D 2	D 1	D Ø

D(7) is a 1 for output: A Ø for input.
D(6) thru D(4) are not used
D(3) is a 1 for ASCII: A Ø for other.
D(2) is a 1 for 5 level Baudot code: A Ø for other
D(1) is a 1 for Binary-Coded decimal (BCD), at two BCD digits per 8 bit word: a Ø for other.
D(Ø) is a 1 for binary data (8 binary bits): a Ø for other.

6.1.4 The D register contains a device code number. Note that this number does not specify input or output, and note also that this number may be readily changed to fit hardware by the IOCS.

6.1.5 Standard Device Code Allocations Are:

Code	Allocation
ØØØ	System Communications Device (TTY or operator I/O)
ØØ1	System Output Device (perhaps line printer)
ØØ2 thru ØØ7	System input/output
Ø1Ø thru 377	Not Allocated

6.2 Program transfer to the IOCS is made by addressing a subroutine jump to location ØØØ Ø7Ø such as CAL Ø7Ø ØØØ or RST 7.

6.3 Memory locations ØØØ Ø7Ø thru ØØØ Ø77 must not be used by the program (these contain the transfer instructions to the IOCS) and also memory locations 000 000 thru 000 007 must not be used unless for restarting and then must be considered volatile (as the IOCS may use it for interrupt in some cases of implementation). The IOCS is assumed to be in upper memory.

7. Programs written to this specification are assured of running on any system which has an IOCS written to this specification provided, of course, that there is room for both the IOCS and the program in memory... The program should occupy the lower end of memory with the exceptions as mentioned in 6.3. I hope that this may provide a workable solution to this very important problem.

8. One word concerning 8008 and 8080 differences... There will be no difficulty if 8080 users will limit themselves to only using the 8008 instruction set for programs to be exchanged among users. For those who would be tempted not to (and I don't blame them), I would like to see a program compatible with this proposal written in 8008 code that would take 8080 code and translate it to the equivalent 8008 listing at the assembly level..

REGISTER ASSIGNMENTS FOR MCS-8 SUBROUTINES

By T. W. Fuller, Santa Barbara

20 April 1975

As a follow-up on the IOCS register assignments proposed by Brion Johnson, the following discussion recommends changes to that proposal, as well as assignments for general subroutine transfers. This will make coding more compact, and easier to implement and understand.

There are basically two ways in which a subroutine may be called with the 8008 instruction set. These are: 1) Using the address stack in a CALL or RST instruction, and 2) jumping to the entry address of the subroutine with the return address contained in two of the scratch pad registers. Obviously, if there is no more stack space, using the second method would be preferable to wiping out the bottom address in the stack by using the first.

In either type of calling method, it may be desirable to save the contents of the registers before executing the meat of the subroutine, so they may be restored before returning to the calling program. The only way these will be store is by using registers L and H. Therefore they cannot be assigned a definite function.

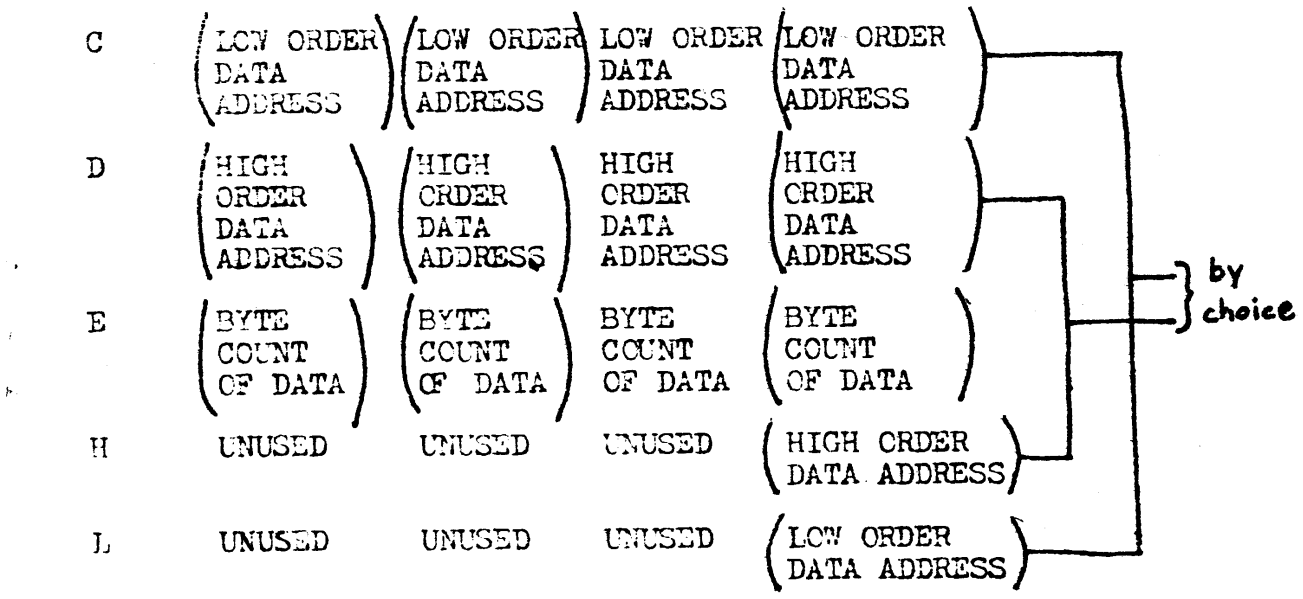
When the second, or jump entry method is used, two registers must contain the return address. It would be most convenient if they could be store directly in the JMP instruction which returns control to the main program. Also, when storing registers for later restoration, it is most convenient to store them in sequence in memory. Therefore, if registers A and B are stored in the second and third bytes of the returning JMP instruction, registers C, D, and E may follow them directly, saving 2 bytes of memory.

The only remaining problem is the manipulation of data, which appears to be well served by placing the starting address and byte count in the remaining 3 registers, as per Brion's proposal. No further information is basically necessary, and the subroutine would only be complicated by requiring more pointers. These registers may be used for any purpose if data is not to be transfered in quantities greater than 3 bytes.

When the CALL method is used, registers A and B are not required to indicate the return address and may be used as necessary to the subroutine.

With these assignments in mind, a slight shuffling of the proposed IOCS parameters is in order so that the assignments may be consistent, and they appear in the table below. Register assignments which are optional are enclosed in parentheses. Returned values may var, depending on how immediately their values will be used.

REGISTER	CALL METHOD	JUMP METHOD	CALL IOCS	RETURNED VALUES
A	(FUNCTION OF SUBROUTINE)	LOW ORDER RETURN ADDRESS	FORMAT OF TRANSFER	(FUNCTION OF SUBROUTINE)
B	(FUNCTION OF SUBROUTINE)	HIGH ORDER RETURN ADDRESS	DEVICE CODE	(FUNCTION OF SUBROUTINE)



The resulting house keeping code for the jump method might appear as follows:

```
SUBRTN:  MVI  L,RETURN+1(L)   'Set up to store registers'
         MVI  H,RETURN+1(H)
         MOV  M,A             'Store return address'
         INR  L
         MOV  M,B
         INR  L
         MOV  M,C             'Store remaining registers'
         INR  L
         MOV  M,D
         INR  L
         MOV  M,E
         .
         .
         (SUBROUTINE)
         .
         .
         MVI  L,RETURN+3(L)   'Set up to restore registers'
         MVI  H,RETURN+3(H)
         MOV  C,M             'Restore registers'
         INR  L
         MOV  D,M
         INR  L
         MOV  E,M
RETURN:  JMP  0               'Return'
         $B,4                 'Set aside block of 4 bytes'
                              'for registers B through E'
```

MODIFIC TION TO PROPOSED SOFTWARE I/O STANDARDS AS SUBMITTED
By Brion Johnson
By T. W. Fuller 13 April 1975

In Brion's proposal, the low order 4 bits of register D indicate the method used in encoding the data to be transferred. Each bit is assigned a different method, thus limiting the number of codes to 4.

One of the advantages of using such as system is the ease with which it can be implemented in a "bare bones" I/O control system (BBIOCS).

There are some facts to consider, however. There are a wide variety of I/O devices available for use in our "community", and not all of them use the same codes or characters sets. There are modifications in the number of special characters, and in whether or not shifting must be a separate operation for teletypes.

It would be advantageous to adopt an assignment in which the four low order bits are considered a single number indicating the coding of the data. In this way it would be possible to assign numbers 0 thru 3 to the proposed four codes, since they are common, and this would be easily incorporated into a BBIOCS. Any other coding or modifications to these four could be indicated by a larger number.

If it is desired to recognize modifications to the original four codes, it would be possible to assign them values whose lower two bits indicate the basic coding scheme, and the upper two bits would indicate the version of the modification. In this way a BBIOCS would not have to be concerned with the modifications, but just look at the lower two bits to determine the coding scheme.

There may still be room for different coding schemes among those values yet unassigned, although this might present a problem for the BBIOCS. It may be better to use of the unassigned bits (bits 4-6) as a flag indicating an odd-ball code.

An example of a BBIOCS to process register D, and select the proper I/O handler might be the following, assuming that registers A, B, C have ben used or saved, and that this routine and all handlers reside in page 0 of memory:

Addr.	Contents	Label	Instruction		Comments
000	303		MOV	A,D	Load A with spec.
001	044		ANI	203	Mask I/O bit and
002	203				code spec, clr C
003	022		RAL		Set C=I/O bit
004	100		JNC	JUST	If C=0 skip to
005	011				JUST
006	000				
007	004		ADI	010	Add 2*length of
010	010				Input Handler table
011	012	JUST:	RRC		Justify and block C
012	004		ADI	TABLE(L)	Add address of
013	026				Handler table
014	056		MVI	H,000	Clear high order
015	000				address
016	360		MOV	L,A	Set L to get handler add.
017	307		MOV	A,M	Load A with handler add.
020	066		MVI	L,JUMP+1	Set L to mod. JMP instr.
021	024				
022	370		MOV	M,A	Modify JMP instr.

```
023     104     JUMP:   JMP  000000    Jump to handler
024     000
025     000
026     ---     TABLE:  (Handler 1) Input Handlers
027     ---             (Handler 2)
030     ---             (Handler 3)
031     ---             (Handler 4)
032     ---             (Handler 5) Output Handlers
033     ---             (Handler 6)
034     ---             (Handler 7)
035     ---             (Handler 8)
```

Ted Lincoln 410 Bell Ave. Santa Ana, Cal. 92707. Finaly got the Mark -8 and TVT working in Dec. TVT modified for cursor control, erase and home controled from keyboard. It also has simplex duplex modes. Mini uses ttl memory instead of 1101 and contains a relay control and a sense board. (almost working) I have a DAC and mag tape modem in process. Delays in geting these on line are not technical but lack of time. (I am an engineer designing computer interfaces for a simulation lab.)

I'd like to make some suggestions.

1) Two modems will be better than one. Dr. Suding's design would be useful for telephone as well as ham. Another design should be adopted for use for high density recording.

2) When adding connecters to the Mark 8 use at least 100 to 120 pins. My choice is 120. Two connectors of 60 each. This allows bussing all important lines plus about thirty spares. Board location is then easily changed. Use I.C. sockets and headers for I/O signals. One sixteen pin socket for two inputs or outputs. Cost less than a dollar even from slip joints.

3) Standardizing data format on mag tape is not important. As long as the person giving you the tape explains the format used you can read into memory reformat and rerecord with your own system.

4) I've got a RTC designed and as soon as I am able to get enough time to get it working I will send along the info.

5) An idea to your readers. When mounting wirewrap IC sockets to vector boards. Drill out the holes of two opposite corners and mount PC board eyelets. Eyelets can be purchased from a local PC board manufacturer, Newark Electronics, etc. Most require a #51 drill. For example drill out holes on the board for pins #1 and #8. Insert eyelet. By holding the eyelet in the hole with a center punch and pushing on the other side of the eyelet with an automatic center punch the eyelet will peen to the board. Insert socket and solder base of pin to eyelet. Socket is now solid on board making it easier to wire.

Ted suggests the "Bugbooks" for those readers asking about books on basics. These start with "this is a diode" and end up with micro processor use and applications. Bugbook I and II, and laboratory workbooks are available for $18.95, and instructors manual for $3.50. The books are centered around EL instrument circuit designer sockets and "outboards", functional modules that plug into the sockets. Contact Edwards Associates, Calif. Federal Bldg., Suite 320, 608 Silver Spur Road, Palos Verdes Peninsula, CA 90274 (213) 377-0975. One of the neatest things available is a set of "bugbacks", a set of printed labels gummed on the back that illustrate IC pin connections. For debugging a tough circuit, these would be fabulous. $4.95 for a set of 500 individualized labels.

A TABLE OF DOUBLE PRECISION WORDS FOR AN 8 BIT MACHINE

If we wish to use numbers higher than 255 decimal in computer calculations using 8 bit words we find that we must concatenate two or more words which is called double or higher precision. Suppose we have the decimal number 2783, we would find that the binary equivalent is;

1 0 1 0 1 1 0 1 1 1 1 1 which in octal is 5337.

Now if we split this into two words of 8 bits each it would be

0 0 0 0 1 0 1 0 and 1 1 0 1 1 1 1 1

Note that the bit arrangement is the same but the octal is now 012 and 337. The first number is called the high order and the second number is called the low order of the double precision number.

Tables of decimal to octal numbers are found in many computer texts and following is the table of octal to double precision numbers.

00XX = 000 0XX	30XX = 006 0XX	60XX = 014 0XX
01XX = 000 1XX	31XX = 006 1XX	61XX = 014 1XX
02XX = 000 2XX	32XX = 006 2XX	62XX = 014 2XX
03XX = 000 3XX	33XX = 006 3XX	63XX = 014 3XX
04XX = 001 0XX	34XX = 007 0XX	64XX = 015 0XX
05XX = 001 1XX	35XX = 007 1XX	65XX = 015 1XX
06XX = 001 2XX	36XX = 007 2XX	66XX = 015 2XX
07XX = 001 3XX	37XX = 007 3XX	67XX = 015 3XX
10XX = 002 0XX	40XX = 010 0XX	70XX = 016 0XX
11XX = 002 1XX	41XX = 010 1XX	71XX = 016 1XX
12XX = 002 2XX	42XX = 010 2XX	72XX = 016 2XX
13XX = 002 3XX	43XX = 010 3XX	73XX = 016 3XX
14XX = 003 0XX	44XX = 011 0XX	74XX = 017 0XX
15XX = 003 1XX	45XX = 011 1XX	75XX = 017 1XX
16XX = 003. 2XX	46XX = 011 2XX	76XX = 017 2XX
17XX = 003 3XX	47XX = 011 3XX	77XX = 017 3XX
20XX = 004 0XX	50XX = 012 0XX	
21XX = 004 1XX	51XX = 012 1XX	* Example shown above.
22XX = 004 2XX	52XX = 012 2XX	
23XX = 004 3XX	53XX = 012 3XX *	
24XX = 005 0XX	54XX = 013 0XX	
25XX = 005 1XX	55XX = 013 1XX	
26XX = 005 2XX	56XX = 013 2XX	
27XX = 005 3XX	57XX = 013 3XX	

George L. Haller, Apr. 1975
Summer Address
Hound Ears Club
Blowing Rock, NC 28605

By Walter M. White, 343 S. Madison Ave., 18, Pasedena, CA 91101

MEMORY TEST PROGRAM FOR MARK-8

Purpose of the program is to thoroughly check the semiconductor memory used with the 8008 for ICs that will not accept data correctly or have problems in their internal address decoding circuitry.

The program starts at location 000 and halts at location 101 upon completion. Pseudo random bit patterns are written into the entire memory (except that portion where the program resides) and then are read back and checked against the pattern written. This process is repeated with 207 different starting points in the random bit pattern. Execution time is approximately 45 minutes for 16K of memory.

No peripheral devices are required, only the means of jamming a NO-OP instruction (LAA = 300_8) into the interrupt instruction port is necessary.

Upon detection of a read error, the program will halt. The LED register connected to output port Ø will indicated which bit of the 8 bit byte was incorrectly read, thus establishing which column the defective memory IC is in. Jamming a NO-OP into the interrupt instuction port will cause the program to halt with the high order address bits of the defective IC. The two displays enables the user to pinpoint the defective IC. The lowest order 8 bits of the address are not displayed as it is immaterial which bit inside the IC is defective, the entire IC must be replaced. Jamming a second NO-OP will cause the program to continue until completion or until another read error is detected. Note: if the program halts with all eight LEDs lit, it indicates a short on the address lines or a wiring error in the memory address circuitry.

LOCATION	INSTRUCTION		COMMENT
This section clears display and initializes registers			
000	046	LEI	Load register E with initial "random number"
001	001	001	
002	026	LCI	Load highest 6 bits of last address in
003	xxx	xxx	memory plus 1 (100_8 for 16K, 004_8 for 1K,
004	056	LHI	008_8 for 2K, etc.)
005	000	000	
006	066	LLI	Load starting memory test address
007	120	120	
010	250	XRA	Clear LED display
011	121	OUT	
This section writes random pattern into memory			
012	334	LDE	Store starting random number for each pass
013	106	CAL	Call random number
014	105	105	
015	000	000	
016	230	SBA	Set all bits of accum. equal to carry bit
017	370	LMA	Store
020	060	INL	Increment memory address location and
021	110	JFZ	continue writing
022	013	013	
023	000	000	
024	050	INH	
025	305	LAH	
026	272	CPC	Continue writing until maximum memory
027	110	JFZ	address is reached
030	013	013	
031	000	000	

This section reads data and checks it against pattern written

```
032     066  LLI     Load starting memory address
033     120  120
034     056  LHI
035     000  000
036     343  LED     Recover starting random number used for
037     106  CAL       last memory write pass
040     105  105     Call random number
041     000  000
042     230  SBA     Set all bits of accum. equal to carry bit
043     257  XRM     Compare with memory data
044     150  JTZ     Jump around error routine if data compares OK
045     056  056
046     000  000
047     121  OUT     Display bits in error
050     001  HLT     User jams a NO-OP to display address of bad IC
051     305  LAH     Display high order bits of memory that failed
052     121  OUT
053     001  HLT     User jams a NO-OP to continue with program
054     250  XRA     Clear display
055     121  OUT
056     060  INL     Increment memory address location
057     110  JFZ
060     037  037
061     000  000
062     050  INH
063     305  LAH
064     272  CPC     Continue reading and comparing until maximum
065     110  JFZ       memory address is reached
066     037  037
067     000  000
```

This section initializes the random number subroutine with a different number for the next write pass through memory.

```
070     343  LED     Recover starting random number used for
071     106  CAL       last memory pass
072     105  105     Call random number
073     000  000
074     074  CPI     Check if all random bit patters have been used
075     001  001
076     110  JFZ     Jump to memory write routine
077     004  004
100     000  000
101     001  HLT     Program stops here when complete
102     104  JMP
103     101  101
104     000  000
```

This section is a pseudo random number generating subroutine. It generates 207 of the possible 256 combination of 8 bits and can be used as the basis for a number of computer games. The main program above uses only the bit that is shifted into the carry position, not the actual random number generated.

```
105     304  LAE     Load accum. with previous random number
106     032  RAR     Rotate 3 bit positions
107     032  RAR
110     032  RAR
111     254  XRE     Exclusive OR with previous random number
112     032  RAR     Rotate new bit into carry
113     304  LAE     Load accum with previous random number
114     032  RAR     Rotate carry into A7 creating new random number
115     340  LEA     Save number in register E
116     007  RET
```

CROSS-LISTING
8008/8080 INSTRUCTION SETS

Mnemonic	8008	8080
Lr_1r_2	3XX	1XX
LrM	3X7	1X6
LMr	37X	16X
LrI	0X6	0X6
	XXX	XXX
LMI	076	066
	XXX	XXX
INr	0X0	0X4
DCr	0X1	0X5
ADr	20X	20X
ADM	207	206
ADI	004	306
	XXX	XXX
ACr	21X	21X
ACM	217	216
ACI	014	316
	XXX	XXX
SUr	22X	22X
SUM	227	226
SUI	024	326
	XXX	XXX
SBr	23X	23X
SBM	237	236
SBI	034	336
	XXX	XXX
NDr	24X	24X
NDM	247	246
NDI	044	366
	XXX	XXX
XRr	25X	25X
XRM	257	256
XRI	054	356
	XXX	XXX
ORr	26X	26X
ORM	267	266
ORI	064	366
	XXX	XXX
CPr	27X	27X
CPM	277	276
CPI	074	376
	XXX	XXX
RLC	002	007
RRC	012	017
RAL	022	027
RAR	032	037
JMP	1X4 *	303 *
JFC	100 *	322 *
JFZ	110 *	302 *

Mnemonic	8008	8080
JFN	120 *	362 *
JFEP	130 *	342 *
JTC	140 *	332 *
JTZ	150 *	312 *
JTN	160 *	372 *
JTEP	170 *	352 *
CAL	1X6 *	315 *
CFC	102 *	324 *
CFZ	112 *	304 *
CFN	122 *	364 *
CFEP	132 *	344 *
CTC	142 *	334 *
CTZ	152 *	314 *
CTN	162 *	374 *
CTEP	172 *	354 *
RET	0X7	311
RFC	003	320
RFZ	013	300
RFN	023	360
RFEP	033	340
RTC	043	330
RTZ	053	310
RTN	063	370
RTEP	073	350
RST	0X5	3X7
INP	1XX	333
		XXX
OUT	1XX	323
		XXX
HLT	00X	166
	or 377	

REGISTERS

REG.	8008	8080
A	000	111
B	001	000
C	010	001
D	011	010
E	100	011
H	101	100
L	110	101
M	111	110
	(spec. by H & L)	

*Bytes 2 & 3 not shown

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SYSTEM/MINAC II Overview

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(1) General Description

SYSTEM/MINAC II is a general-purpose medium speed small scale digital computer processing system built around the Intel 8008-1 microprocessing chip. Architecture is buss-oriented, with a "wired or" cpu input buss shared by memory, interrupt, and input; and with a latched address and direct data cpu output buss. Physically, the processor is housed in a seven inch by 19 inch rack mount card cage with 12 card slots. Card slots 2 and 4 are reserved for the CPU board which contains the 8008-1 chip, but otherwise, the slots are bussed and may contain any card. The minimum operating configuration consists of the memory card (93410 - 256 locations) and the cpu card, used in conjunction with the front panel.

(2) Memory

Memory for the system consists of 8192 locations of 8 bits each (1 byte) organized in halfwords (2 bytes) with a write protect bit and program accessible flag bit associated with each halfword. The write protect bit prevents accidental erasure of information while the flag bit may be used for parity, word mark, EOF, etc. Data access time is 2.5 micro-sec, and full cycle time is 6 micro-sec. The storage medium is magnetic ferrite cores which retain information when power is removed. The unit is a model 28RVQ4096 made by Ampex Computer Products Corp.

(3) System Teletype

The teletype (used for system commands or as needed) is a Teletype Model 14 typing reperforator. The TTY uses a 5-level Baudot Code. Typing is don on a 3/8" wide gummed paper tape.

(4) System Teleprinter

Page Output is provided by a CW/895/UG teleprinter mfg. by Mite Corp. The teleprinter uses 5 level baudot code, and can type 76 characters per line at 40, 60, or 100 wpm.

(5) High Speed Tape Punch

High speed paper tape output is provided by a Teletype Corp. Model BRPE2 punch. Capacity is seven level at 1100 wpm.

(6) Paper Tape Reader

Two medium speed paper tape readers are available to read 8 level paper tape. These units are mechanical, manufactured by the Soroban Corporation.

(7) Magnetic Cassette

A cassette interface is proposed using FSK encoding upon unmodified audio consumer cassette tape recorders.

(8) Multiport

Bitwise input/output is available over multiport, originally planned for 8 each 8 bit words out and 4 each 8 bit words in.

Pages From Bob Cook's CREED Baudot TTY Manual.

4. The Character Set

4.1 Methods of Changing and Expanding

The current character set is described in the table in 4.2 and the typehead layout in 4.3. You will probably desire to replace some of the fractions with more useful characters. A proposed set of characters are shown in the table in 4.2 and a procedure for replacing characters is included in a later section. In order to have upper case H and S print it will be necessary to remove two springs to disable their function bars as is also described later.

The character set chosen is a compromise between several conflicting considerations, however, it is very close to the standard Baudot communications set. It is possible to create some additional characters by combining characters as follows: (!)=(')+(.), (+)=(-)+(|), (*)=(-)+(|)+(X), and ($)=(S)+(|). Since there is no backspace facility, the best way to achieve this result is to separately control the non-print and non-feed solenoids which are presently connected in parallel. This would require an additional drive circuit and rewiring the solenoids inside the machine in order to get access to them separately. Then it would be possible to turn on the non-feed solenoid, print multiple characters and turn off the non-feed solenoid just before the last of the multiple characters.

4.2 Code Table

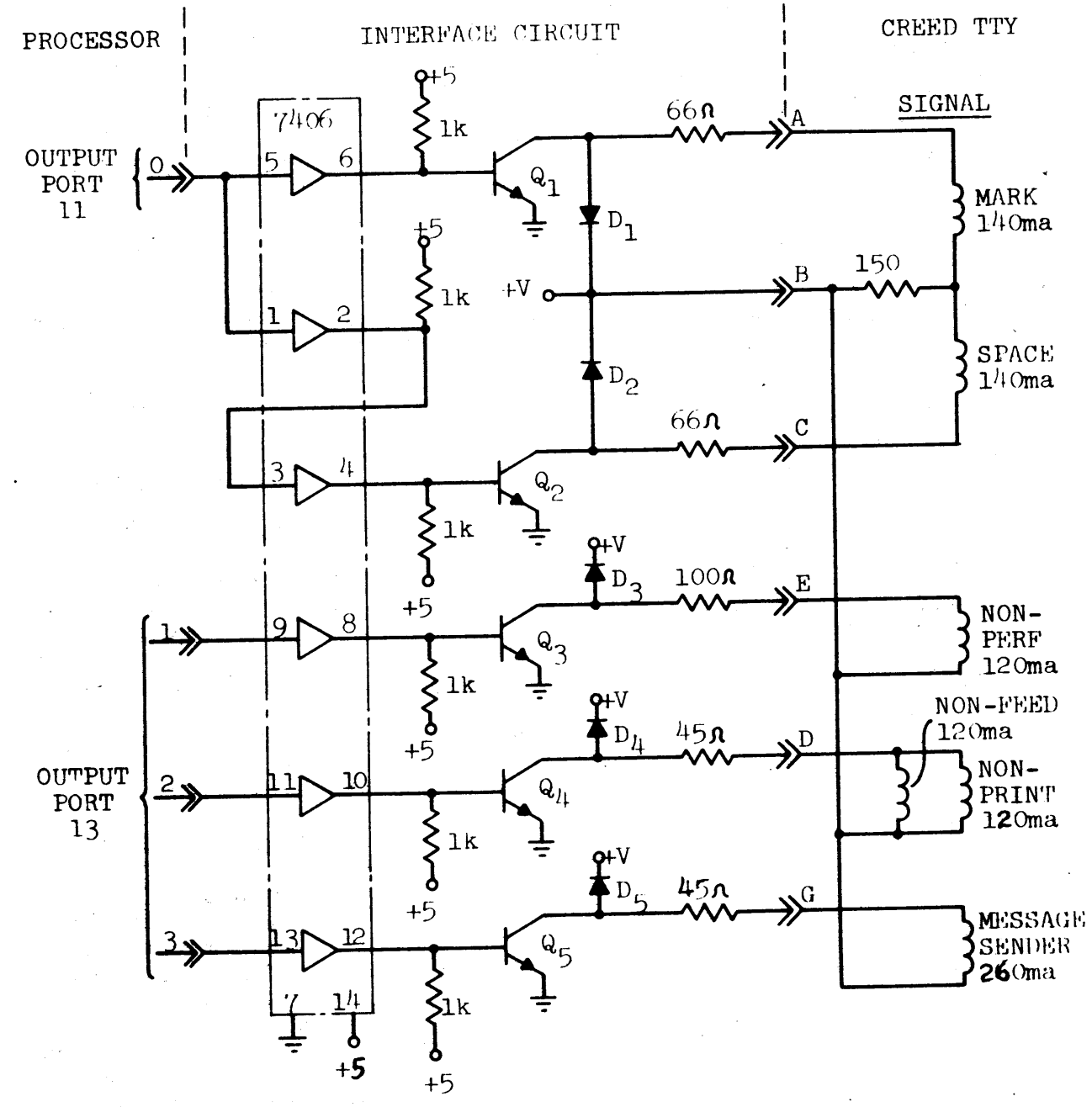
LTRS SHIFT	FIGS SHIFT	PROPOSED FIGS SHIFT	BINARY	OCTAL	LTRS SHIFT	FIGS SHIFT	PROPOSED FIGS SHIFT	BINARY	OCTAL
A	-	-	00011	03	Q	1	1	10111	27
B	5/8	?	11001	31	R	4	4	01010	12
C	1/8	:	01110	16	S		@	00101	05
D	1/3	=	01001	11	T	5	5	10000	20
E	3	3	00001	01	U	7	7	00111	07
F	2/3	&	01101	15	V	3/8	;	11110	36
G	'	'	11010	32	W	2	2	10011	23
H		%	10100	24	X	/	/	11101	35
I	8	8	00110	06	Y	6	6	10101	25
J	1/4	.	01011	13	Z	"	"	10001	21
K	1/2	(	01111	17	CR	CR	CR	01000	10
L	3/4	)	10010	22	SPACE	SPACE	SPACE	00100	04
M	#	#	11100	34	FIGS	FIGS	FIGS	11011	33
N	7/8	,	01100	14	LTRS	LTRS	LTRS	11111	37
O	9	9	11000	30	BLANK	BLANK	BLANK	00000	00
P	0	0	10110	26	LF	LF	LF	00010	02

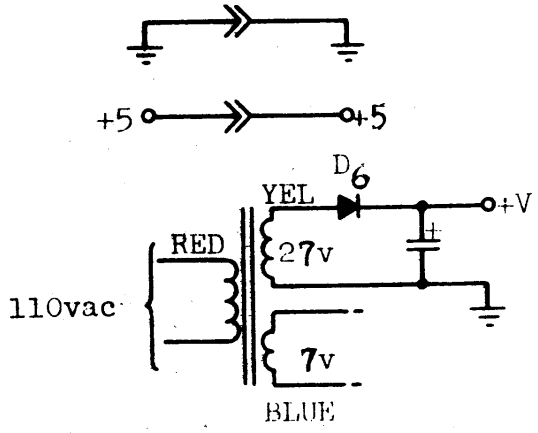
4.3 Typehead Layout

The diagram on page 4 is the original typehead layout specification for the Speigel Project. It will be very useful when you are changing typefaces on the typehead.

5. Machine description

The tables and figures of this section will help you to find your way around the Creed. The component location figure and table and the special component location figure should get you oriented. The combination of the wiring diagram and wiring layout and color coding should enable you to work with the wiring if you desire to. The operations counter chart and figure will explain its operation. Some additional figures are placed elsewhere in the manual where it seemed appropriate.





COMPONENT	CODE
Q_1-Q_5	2N3725
D_1-D_5	1N625
D_6	1N4004

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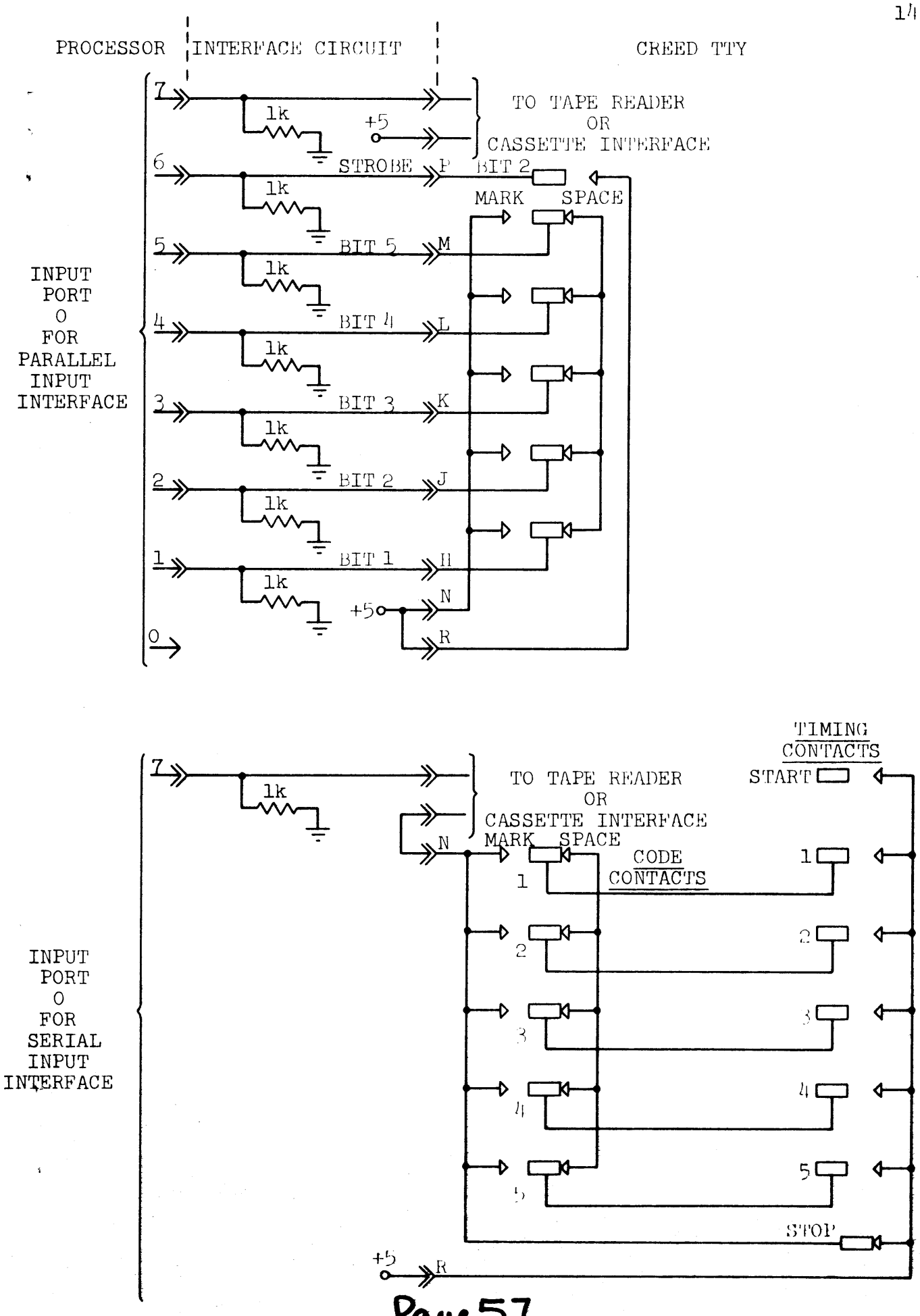
PROCESSOR
INTERFACE CIRCUIT
CREED TTY
INPUT PORT 0 FOR PARALLEL INPUT INTERFACE
7
6
5
4
3
2
1
0
1k
+5
STROBE P
BIT 5 M
BIT 4 L
BIT 3 K
BIT 2 J
BIT 1 H
N
R
TO TAPE READER OR CASSETTE INTERFACE
BIT 2
MARK
SPACE
INPUT PORT 0 FOR SERIAL INPUT INTERFACE
TIMING CONTACTS
START
CODE CONTACTS
STOP

8. Basic Creed Monitor

The Basic Creed Monitor (BCM) takes up the first 256 word page of memory and performs many essential functions. The monitor commands listed below, which are entered via the Creed keyboard, largely replace the panel functions and are much more powerful and easier to use. The loader program is essential in order to get other programs into memory conveniently.

Although the BCM is intended to be in a Read Only Memory(1702A PROM) in page 0, it also requires an area of RAM (read/write memory) in page 2 for temporary storage and user options. The BCM uses 3 of the 8 restart instructions, but the other 5 are available for user use by means of pointers in RAM. There is also a pointer to allow the user to add his own monitor commands which are two letters, V followed by a letter chosen by the user.

A serial monitor will also be provided which will differ from the following listing in that a JMP RD instruction will be inserted at BCIN (331). Another version of the serial monitor (BCM-S2; the first serial monitor will be called BCM-S1) with reassigned addresses and two more commands (display H and display L) will be offered later.

A two page monitor will also be offered called BCM-2(on two 1702A's) which will perform a few more commands and do conversion between ASCII and Baudot as well as between a 6 bit code(5 Baudot bits and a case (upper=1 and lower=0) bit) and Baudot. The BCM-2 will also have about half of the dump(to paper tape or cassette interface) routine. The rest of the dump routine may be tailored to the desired format by utilizing the appropriate pointers in RAM and adding the correct subroutines. A couple of changes are necessary in the BCM listing included here to utilize it with the second page of the BCM-2. The changes are inserting the commands JFZ 407; JMP 400 at location 136, in order to extend the monitor command search. The second page of the monitor (see listing in 9.) will be located in page 1. Other versions of the monitor using other pages for RAM, e.g. page 10, and for the second page of the monitor will be offered if there is sufficient interest. It would be possible to order the first page of BCM-2 and load the second page in RAM, however it would require loading manually via switches the following instructions every time the processor is turned on: JMP CLP at 400; CFZ 1005 at 407 and JMP CLP at 412.

8.1 Basic Creed Monitor Commands.

0,1,...,7 - Shift buffer left 3 bits, put octal digit in low 3 bits and display.
L - Put buffer in L, clear buffer and display.
H - Put buffer in H, clear buffer and display.
M - Put buffer in memory word addressed by H:L, clear buffer, increment H:L and display buffer.
C - Display memory word addressed by H:L.
I - Increment H:L.
D - Decrement H:L.
O - Load memory from serial input (paper tape or cassette).
X - Execute loaded program.
V* - Execute user control routines or programs as defined by user in RAM.
A* - Display L.
B* - Display H.
S# - Put H:L in start address (1001).
N# - Put H:L in end address (1003).
Z# - Dump memory from start to end address. Format determined by user.

\# - Only in BCM-2.
* - Only in BCM-2 or BCM-S2.

8.2 Loader format

← bbbb....bbbbbcdefghgh....ghbbbbbbb

b - blank tape
c - low 4 bits of low 8 bits of load address
d - high 4 bits of low 8 bits of load address
e - low 4 bits of high 8 bits of load address
f - high 4 bits of high 8 bits of load address
g - low 4 bits of a data word
h - high 4 bits of a data word

The high order bit of each 5 bit word is ignored, except in looking for the blank header and trailer, i.e. the 5th bit may be 1 or 0 except that 0000 must always be 10000 rather than 00000.

8.3 Subroutine descriptions.

SUBROUTINE	ADDRESS	REGISTERS DESTROYED	DESCRIPTION
TIME	10	C	WAIT FOR 6.67 milliseconds
INHL	40	H,L	INCREMENT H AND L COMBINED
CA2	147	A,C,H,L	SEARCH TABLE- SEE COMMENTS IN LISTING
WD	227	A,B,C,D	COMBINE TWO 5 BIT WORDS, STORE IN MEMORY AND INCREMENT H:L
RD	250	A,B,C	GET 5 BIT WORD FROM SERIAL 100 WPM DEVICE AND PUT IN A (LOW 5 BITS)
CD	301	A,D,E	DECREMENT D:E
CI	311	D,E	INCREMENT D:E
BCOT	315	A,C	TRANSMIT LOW 5 BITS OF A TO CREED
BCIN	331	A,C	GET CHARACTER FROM CREED AND PUT IN LOW 5 BITS OF A
INII#	440	A,B,C	GET CHARACTER FROM CREED KEYBOARD, TRANSLATE TO ASCII AND PUT IN A
IN6#	454	A,B,C	GET CHARACTER FROM CREED KEYBOARD, TRANSLATE TO 6 BIT CODE AND PUT IN A
OTII#	617	A,B,C	TRANSLATE ASCII CHARACTER IN A TO BAUDOT AND TRANSMIT TO CREED PRINTER OR PUNCH
OT6#	642	A,B,C	TRANSLATE 6 BIT CHARACTER IN A TO BAUDOT AND TRANSMIT TO CREED PRINTER OR PUNCH.

8.4 Addition of 1702A's to Mark-8 memory board.

One or two 1702A's may be added to a Mark-8 memory board by a simple process as follows. Obtain a 24 pin socket and a piece of perf board about the size of the socket. Using a small drill and the perf board as a patern, drill holes for the socket in one of the blank areas above or below the 7442 decoder. Insert the socket and connect the power and ground leads. Connect the address and data output lines in parallel with those for the 1101's. Connect one of the enable outputs of the 7442 to the select input of the 1702A. If the desired enable output is already connected to a row of 1101's, e.g. the enable for page 0, then move to the 1702A and connect one of the other enables to the row of 1101's or if desired leave it unconnected. If information on the pin connections for the 1702A is desired, request when ordering the 1702A.

```
   * RESET 0
 0      JMP 1013  JUMP TO USER RST POINTER
 3 CL   LEB       PUT B IN LOW ADR
 4 CLA  SBA
        LBA
        OUT 10    DISPLAY BUFFER ON PANEL
        RET
   * RESET 1
10 TIME LCI 147   WAIT FOR 6.67 MS
12 TL   DCC
        JFZ TL
        RET
        HLT       UNUSED WORD
   * RESET 2
20      JMP 1016  JUMP TO USER RST POINTER
23 CC   LAM
        OUT 10    DISPLAY MEMORY ON PANEL
        RET
        HLT       UNUSED WORD
        HLT       UNUSED WORD
   * RESET 3
30      JMP 1021  JUMP TO USER RST POINTER
33 WD2  RLC
        NDI 360
        ORE
        LMA       FALL THRU TO DO INHL AND RET
   * RESET 4
40 INHL INL       INCREMENT H:L
        RFZ
        INH       IF L=0 THEN INCREMENT H
        RET
44 CH   LDB       PUT B IN HIGH ADR
        JMP CLA
   * RESET 5
50      JMP 1024  JUMP TO USER RST POINTER
53 CDA  DCE       CONTINUE DECREMENT D:E
        NDA
        RFZ
        DCD
        RET
```

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```
   * RESET 6
60      JMP 1027  JUMP TO USER RST POINTER
63 CX   JMP 1000  JUMP TO EXECUTE POINTER
66 CV   JMP 1032  JUMP TO EXTD CTL POINTER
   * RESET 7 - LAST WORD OF LAST JMP IS EXECUTED
   *     BY RESET 7 AS A ONE WORD INSTRUCTION
   *     WHICH IS A NOP FOR THE FOLLOWING
******* START MONITOR *******
71      LAI 377   INITIALIZE TTY OUTPUT
        OUT 11
        OUT 13
75 CLP  CAL BCIN  GET A WORD FROM CREED KEYBD
        LHC       H=0
        LHI L(TTBL-1)
        LCI 11    LOOP INDEX
105 CB  INL
        DCC
        JTZ CA    JMP IF NOT OCTAL DIGIT
        CPM
        JFZ CB    JMP IF NOT THIS DIGIT
        DCC       CORRECT OCTAL DIGIT
        LAB       GET CURRENT DATA FROM BUFFER
        RLC
        RLC       SHIFT LEFT 3 BITS
        RLC
        NDI 370   CLEAR LOW 3 BITS
        ORC       OR IN 3 NEW BITS
        LBA       PUT BACK IN BUFFER
        OUT 10    DISPLAY BUFFER ON PANEL
        JMP CLP   GO BACK TO MAIN LOOP
133 CA  CAL CA2   LOOK FOR A CONTROL CHARACTER
136     CFZ 1005  EXECUTE CONTROL ROUTINE IF Z=0
        JMP CLP   GO BACK TO MAIN LOOP
144 CA3 INL       INCREMENT TABLE ADR POINTER
        INL
        RTZ       RETURN IF END OF TABLE
   * TABLE SEARCH ROUTINE. START AT H:L ADR
   * AND GO TO END OF PAGE. EACH TABLE ENTRY HAS
   * TWO WORDS: CHARACTER AND LOW ADR. IF A IS
   * FOUND IN TABLE Z=0  AND JMP TO LOW ADR IN THI
   * PAGE IS CONSTRUCTED AT 1005. IF A IS NOT
   * IN TABLE THEN Z=1.
```

```
147 CA2  CPM        IS THIS AN OCTAL DIGIT
         JFZ CA3
153 CF   INL        CONTROL CHARACTER FOUND
         LCM
         LAH
         LLI 5      CONSTRUCT JMP INSTRUCTION AT
         LHI 2      1005
         LMI 104    INSERT JMP OP CODE
         INL
         LMC
         INL
         LMA
         LHD
         LLE
         RET
173 LOAD LLI 0      LOAD MEMORY FROM SERIAL DEV
         LHI 2      SET UP JMP AT EXEC. LOCATION
         LMI 104    INSERT JMP OP CODE
         RST 40     INCREMENT H:L
202 LD1  CAL WD     GET LOW ADR FROM TAPE
         JTZ LD1    SKIP HEADER
         CAL WD     GET  HIGH ADR FROM TAPE
         RTZ
         DCL
         DCL
         LLM
         LHA
220 X    CAL WD     LOAD LOOP
         RTZ        STOP IF BLANK TRAILER
         JMP X
    * GET TWO 5 BIT WORDS AND COMBINE THEM INTO
    * ONE 8 BIT WORD
227 WD   CAL RD     GET FIRST 5 BIT WORD
         RTZ
         NDI 17     MASK OUT ALL BUT 4 BITS
         LEA
         CAL RD     GET SECOND 5 BIT WORD
         RTZ
         RLC        SHIFT SECOND WORD IN ORDER
         RLC        TO COMBINE WITH FIRST
         RLC        WORD
         JMP WD2    CONTINUE AT WD2

    * GET A 5 BIT WORD FROM CREED
250 RD   INP 0
         NDA        DESTROYS A,B,C
         JTS RD     WAIT FOR START BIT
         LBI 100    LOAD MARKER BIT
257 RL   RST 10     WAIT 1/2 BIT TIME
         INP 0
         RST 10     WAIT
         NDI 200    MASK OUT THE BIT
         ADB        ADD A AND B AND CARRY = 0
         RAR
         LBA
         JFC RL     LOOK FOR MARKER BIT
         RRC
         LBA
         NDI 37     MASK AND CHECK FOR BLANK
         RTZ        RETURN IF BLANK WITH Z=1
         CPB        CLEAR Z BIT
         RET
301 CD   LAE        DECREMENT D:E
         JMP CDA    CONTINUE AT CDA
305 CW   LMB        WRITE B AT ADR IN MEMORY
         SBA
         LBA
         OUT 10     DISPLAY ON PANEL
311 CI   INE        INCREMENT ADR POINTER
         RFZ
         IND        IF E=0 INCREMENT D
         RET
315 BCOT ORI 140    BASIC CREED OUTPUT
         RAL        DESTROYS A,C
320 OUTL OUT 11     PUT OUT A SERIAL BIT
         RST 10     WAIT 1/2 BIT TIME
         RAR
         NDA
         RTZ        RETURN IF FINISHED WITH WORD
         RST 10     WAIT 1/2 BIT TIME
         JMP OUTL
331 BCIN INP 0      BASIC CREED INPUT
         NDI 100    DESTROYS A,C
         JTZ BCIN   WAIT FOR STROBE BIT
         RST 10     WAIT 1/2 BIT TIME
```

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```
340       INP 0      GET THE 5 PARALLEL BITS
          RST 10
          RST 10     WAIT FOR STROBE BIT TO GO AWAY
          RRC
          NDI 37     MASK OUT ALL BUT 5 BITS
346       RET
      * THIS TABLE HAS OCTAL CHARACTERS, CONTROL
      * CHARACTERS AND ADR OF CONTROL SUBROUTINE
      * NOTE THAT FIRST TABLE ENTRY IS ALSO RET
      * ABOVE, I E OVERLAP IS O K
346 TTBL      07     7
347           25     6
350           20     5
351           12     4
352           01     3
353           23     2
354           27     1
355           26     0
356           22     L
              L(CL) PUT BUFFER IN LOW ADR
360           24     H
              L(CH) PUT BUFFER IN HIGH ADR
362           06     I
              L(CI) INCREMENT ADR POINTER
364           34     M
              L(CW) WRITE BUFFER IN MEMORY
366           35     X
              L(CX) EXECUTE LOADED PROGRAM
370           30     O
              L(LOAD) LOAD MEMORY
372           11     D
              L(CD) DECREMENT ADR POINTER
374           36     V
              L(CV) EXTENDED CONTROL RTN
376           16     C
              L(CC) DISPLAY MEMORY ON PANEL
```

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```
                RAM LAYOUT
1000            JMP        EXECUTE LAST LOADED INSTRUCTION
1003                       END ADDRESS FOR DUMP PROGRAM
1005                       SAVE AND MONITOR EXECUTE AREA
1011                       CASE BIT FOR ASCII CONVERSION
1012                       OUTPUT PORT STATUS
1013            JMP        RST 00 USER POINTER
1016            JMP        RST 20 USER POINTER
1021            JMP        RST 30 USER POINTER
1024            JMP        RST 50 USER POINTER
1027            JMP        RST 60 USER POINTER
1032            LHI        ) ENTER HERE FROM USER COMMAND V
1034            LLI        ) LOAD ADR OF USER COMMAND TABLE
1036            CAL BCIN   GET NEXT CHARACTER FROM CREED
1041            CAL CA2    DO TABLE SEARCH
1044            JFZ 1005   EXECUTE COMMAND IF FOUND
1047            RET        RETURN TO MONITOR
1050 HDTL       JMP        GO TO HEADER OR TRAILER ROUTINE
                           OR INSERT  RET  IF NONE
1053 AOT8       NOP        NOP(LAA) IF START ADR IS TO BE
                           PUNCHED OR  INSERT  RET IF NOT
1054 OT8        JMP        GO TO SUBROUTINE TO PUNCH AN 8
                           BIT WORD AND INCREMENT H:L
-------------------------------------------------------
                BCM - 2  LISTING
 400            LHI 1      )
 402            LLI 366    )ADDRESS OF CONTROL TABLE
 404            CAL CA2    SEARCH CONTROL TABLE
 407 C2E        CFZ 1005   CALL CONTROL ROUTINE IF FOUND
                JMP CLP    RETURN TO MAIN LOOP
 415 CA         LAL        DISPLAY L
                OUT 10                ON PANEL
                RET
 420 CB         LAH        DISPLAY H
                OUT 10                ON PANEL
                RET
 423 CS         LLI 1      START ADDRESS
 425 CSN        LHI 2
                LME
                INL
                LMD
                RET
```

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BCM-2 CONTINUED

```
433 CW  LLI 3       STORE H:L IN END ADDRESS
        JMP CSN     GO TO COMMON PART
440 INII CAL IN6    ASCII INPUT FROM 5 BIT DEVICE
        LHI 1       INDEX INTO TABLE TO TRANSLATE
        ADI 100
        LLA
        LAM         GET ASCII WORD FROM TABLE
        LHB         RESTORE H AND L
        LLC
        RET
454 IN6 LBH         6 BIT INPUT FROM 5 BIT DEVICE
        LCL         SAVE H AND L
        LHI 2       CASE BIT ADDRESS - 1
        LLI 10
        LMC         SAVE L IN RAM
        INL
464 A   CAL BCIN    GET A 5 BIT CHARACTER FROM TTY
        CPI 37      IS THIS LETTER CHARACTER ?
        JFZ B       IF NOT GO TO B
        LMC         SET CASE TO LTR (0)
        JMP A
500 TRTB    000     BLANK TAPE(NUL)
501         105     E
502         012     LF
503         101     A
504         040     SPACE
505         123     S
506         111     I
507         125     U
510         015     CR
511         104     D
512         122     R
513         112     J
514         116     N
515         106     F
516         103     C
517         113     K
520         124     T
521         132     Z
522         114     L
523         127     W
524         110     H
525         131     Y
526         120     P
527         121     Q
530         117     O
531         102     B
532         107     G
533         377     FIG (NO CORRESPONDENCE)
534         115     M
535         130     X
536         126     V
537         377     LTR (NO CORRESPONDENCE)
540         000     BLANK TAPE (NUL)
541         063     3
542         012     LF
543         055     -
544         040     SPACE
545         100     @
546         070     8
547         067     7
550         015     CR
551         075     =
552         064     4
553         056     .
554         054     ,
555         046     &
556         072     :
557         050     (
560         065     5
561         042     "
562         051     )
563         062     2
564         045     %
565         066     6
566         060     0
567         061     1
570         071     9
571         077     ?
572         047     '
573         377     FIG (NO CORRESPONDENCE)
574         043     #
575         057     /
576         073     ;
577         377     LTR (NO CORRESPONDENCE)
600 B   CPI 33      IS THIS FIGURE CHARACTER?
        JFZ C       IF NOT GO TO C
        LMI 40      SET CASE TO FIG (40)
        JMP A       GET ANOTHER 5 BIT CHARACTER
612 C   DCL
        LCM
```

```
614       LLC        SET UP C FOR INII
          LHB
          RET
617 OTI1  LBH        ASCII OUTPUT TO CREED
          LCL        SAVE H AND L
          LHI 1       ADDRESS 6 BIT TO ASCII TABLE
          LLI 100
625 OSLP  INL
          JTS DEF    IF END OF TABLE GO TO DEF
                     DEFAULT =   000
          CPM        IS THIS ENTRY = A?
          JFZ OSLP   IF NOT GO ON TO NEXT ENTRY
635 DEF   LAL
          SUI 100    CALCULATE 6 BIT EQUIVALENT
          LHB        RESTORE H AND L
          LLC
642 OT6   LBH
          LCL
644 OIIE  LHI 2      ADR OF CASE BIT - 2
          LLI 7
          LMB
          INL
          LMC
          LBA        SAVE 6 BIT WORD
          NDI 40     MASK OUT CASE BIT
          CPM        IS THE CASE BIT THE SAME?
          LMA        UPDATE CASE BIT
          JTZ SC     GO TO SC IF SAME CASE
          NDA
          LAI 37     PUT LTR IN A
          CFZ LFIG   IF IT WAS FIG THEN LOAD FIG
          CAL BCOT   SEND CASE SHIFT CHARACTER
675 SC    LAB        SEND OUT THE CHARACTER TO CREED
          DCL        RESTORE H AND L FROM RAM
          LCM
          DCL
          LHM
          LLC
          JMP BCOT
706 LFIG  LAI 33     PUT FIG IN A
          RET

711 DUMP  RST 1      WAIT
          RST 1
          RST 1
```

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```
714       CAL HDTL   PUNCH HEADER (HDTL IS A POINTER
          LHI 2      IN RAM)
          LLI 4
          LDM        )
          DCL        ) PUT END ADR IN D:E
          LEM        )
          DCL
          DCL
          CAL AOT8   PUNCH START ADDRESS(OPTIONAL)
          CAL AOT8
          DCL
          LLM        ) PUT START ADR IN H:L
          LHA        )
713 A     CAL OT8    PUNCH AN 8 BIT WORD
          LAD
          CPH
          JFZ A      IF NOT TO END THEN DO ANOTHER WORD
          LAE
          CPL
          JFZ A      IF NOT TO END THEN DO ANOTHER WORD
          JMP HDTL   DO TRAILER AND RETURN TO CALLING
                     PROGRAM
763         *** three unused words***
766       03     A
          L(CA) DISPLAY L ON PANEL
          31     B
          L(CB) DISPLAY H ON PANEL
770       05     S
          L(CS) STORE H:L IN START ADDRESS
772       14     N
          L(CN) STORE H:L IN END ADDRESS
774       21     Z
          L(DUMP) DUMP MEMORY TO PUNCH OR TAPE
776
```

OCTAL KEYBOARD INPUT LOADER -- By William B. Severance, Jr.
Center Lovell, MN 04016
(207) 925-2271

As one soon tires of loading a mini-computer such as the Mark 8 via the interrupt-jam port data switches, it becomes apparent that a calculator style entry of the octal digits is needed. In the following two diagrams, such a device is described. One will note the following features:

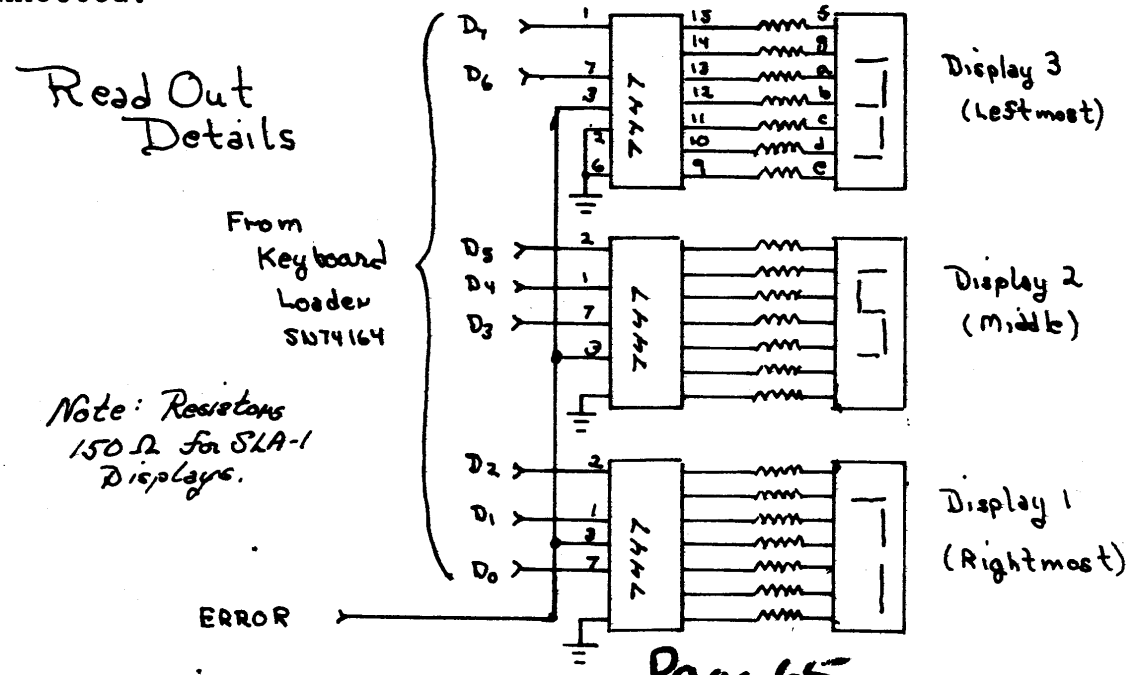
1) Digits are entered most significent digit first with automatic shifting of previously entered digits to the left with each new entry up to a maximum of 377.

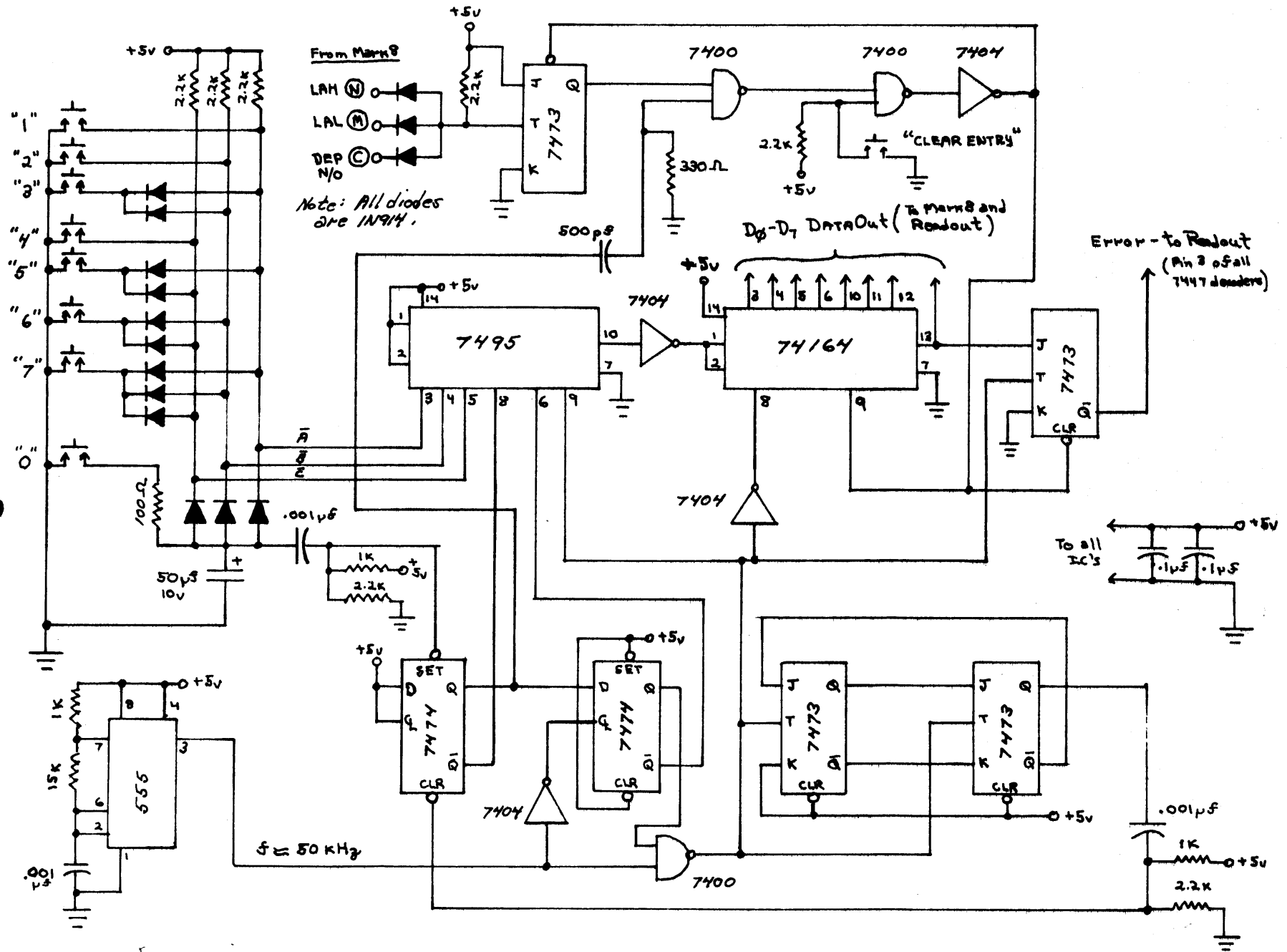
2) Should more than three digits be entered or the leftmost digit (representing bits 7 and 6) be greater than 3, the display will show an error indication of 888.

3) The "CLEAR ENTRY" key may be pressed at anytime to clear the display and output register. After an entered number is used (as signaled by pressing the Mark 8 LAH, LAL, or DEP keys), the next digit entered will automatically clear the output register and display before appearing, thus speeding up entry of one number after another.

4) Not only is this design simpler than that appearing in the Dec. 1974 issue of Popular Electronics, it is more convenient to use in that leading zeros need not be entered and there is automatic clearing of output register and display after an entry is used.

I am currently working on a PC board for this design and when ready will mail Xerox copy upon receipt of SASE. As for parts used, the following notes apply: Keyswitches are from Solid State Systems, Inc. and do not require additional debouncing--others might. Readouts are Opcoa SLA-1's. As for interfacing with Mark 8, you may simply replace the 8 interrupt port data switches with the keyboard loader and make the connections to the LAH, LAL, and DEP switches. Or, you may do as I've done and leave the interrupt port as is after adding a separate Jam input port to which the keyboard loader is permently connected.





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Octal Keyboard Input Loader — By Wm. Severance, Jr.

MARK-8 BUS SIGNAL DESCRIPTION

By Laurence L. Plate, Jr., 2320 Skyline Way, Santa Barbara, CA 93109

INTER-BOARD WIRE NO.	FUNCTION	SOURCE BOARDS	DESTINATION BOARDS	SYMBOL(S)
1	OUT PORT MSB R BIT	MA	CPU	A13,R2
2	not used			
3	COMMOM GROUND		ALL	GND,GROUND
4	STATE CONTROL SIGNAL	CPU	DI	S0,SL0
5	STATE CONTROL SIGNAL	CPU	DI	S1,SL1
6	+5 VOLT POWER		ALL	+5
7	-9 VOLT POWER		MA,CPU	-9
8	CPU READY LEVEL	MA	CPU	RDY,READY
9	MEMORY ADDRESS &	MA	CPU	D0
10				D1
11				D2
12				D3
13	INPUT BUS LINES *	DI	MM,OL	D4
14				D5
15				D6
16				D7
17	I/O OUTPUT SIGNAL **	CPU	***	OUT, OUTPUT
18	OUTPUT BUS LINES	CPU	MA,MM	D7
19				D6
20				D5
21				D4
22				D3
23				D2
24				D1
25				D0
26	MEMORY READ/WRITE SIGNAL	CPU	MM	R/W
27	I/O INPUT SIGNAL	CPU	DI	$\overline{IN}$
28	I/O OUTPUT SIGNAL	CPU	OL	$\overline{OUT}$
29	CYCLE CONTROL SIGNAL	MA	CPU	CC1
30	CYCLE CONTROL SIGNAL	MA	CPU	CC0
31	CPU LAL SIGNAL	CPU	MA	LAL
32	CPU LAH SIGNAL	CPU	MA	LAH
33	OUT PORT LSB R BIT	MA	CPU	A12,R1
34	I/O DATA ENABLE SIGNAL	CPU	DI,OL	DEN
35	I/O INTERRUPT SIGNAL	MA	CPU	INT
36	KEYBOARD INTERRUPT	MA	CPU	EX INT
37	CPU WAIT FLAG ****	CPU	N/C	FLAG
38	HIGH MEMORY ADD. BIT	MA	MM	A
39	DITTO & I/O PORT BIT	MA	MM,DI,OL	B
40	DITTO & DITTO	MA	MM,DI,OL	C
41	DITTO & DITTO *****	MA	MM,DI,OL	D

* Memory address lines and input bus lines are not common.

** Titus expansion signal for additonal output ports (note: it bypasses the RR≠00 condition,).

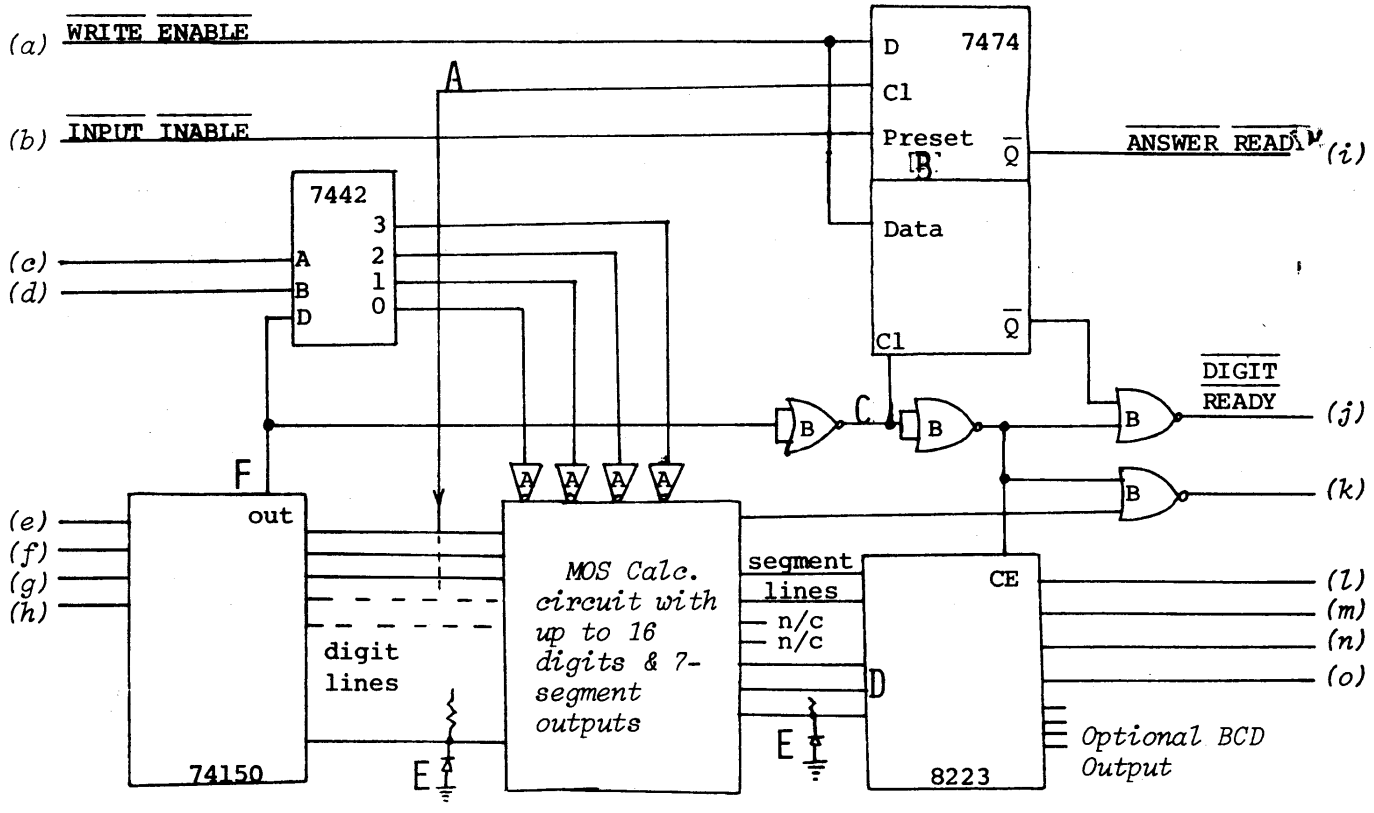
*** for Titus' port expansion logic.

**** apparantely for slow memories

***** Wires 39-41 serve a double duty as shown above.

Ken A. McGinnis
P.O. Box 2078
San Mateo, Ca. 94401

Universal Calculator Circuit with all control inputs and outputs negative true.



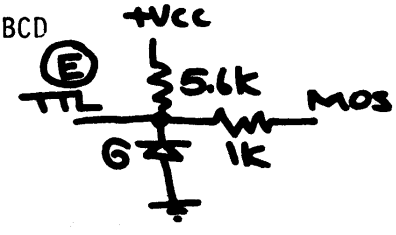
IC A is 1/6 7406 — *(c,d)* are BCD inputs to select a keyboard input (up to 4)
IC B is 1/4 7402 — *(e,f,g,h)* are BCD inputs to select a digit output (up to 16)
(l,m,n,o) are BCD outputs after conversion from 7-segments
(k) is a Decimal Point output

This circuit is similar to the one to be offered by the Digital Group, P.O. Box 6528 Denver, Colorado, 80206.

A from any digit which always appears in the answer
B INPUT ENABLE causes $\overline{Q}$ to preset so *(i)* = 1; When A appears with Write Enable *(i)* =0
C When selected digit appears with WRITE ENABLE, *(j)* is true
D segment outputs a,b,e,f,g are used as the 5 address lines to the 8223 PROM
E resistor-diode network suggested by the Digital Group as MOS to TTL converters
F 74150 output goes low when selected digit is true

TRUTH TABLE FOR PROGRAMMING 8223 FOR 7-SEGMENT CONVERSION TO BCD

Decimal Equivalent	Address Lines For Segment Outputs	Outputs Of ROM (BCD Equivalents)	
0	01111	0000	
1	00010	0001	
2	10111	0010	
3	10011	0011	
4	11010	0100	
5	11001	0101	
6*	11100	0110	*5 segment 6*
6*	11101	0110	*6 segment 6*
7	00011	0111	
8	11111	1000	
9	11011	1001	*5 or 6 segments 9*



****

* FLASH !! A 4K & 8K version of BASIC from the folks at MITS !! *

****

In the latest (& first) copy of the Altair Users Group newsletter, "COMPUTER NOTES", the people who brought you the Altair 8800 have announced the availability of a 4K and an 8K version of BASIC (Beginner's All-purpose Symbolic Instruction Code). Now, if you've had occasion to use BASIC in the past then you realize that it is unquestionably the language for the home computer. If you haven't had any experience with it....then by all means start doing some checking into the subject.

We've included the two ads from the newsletter for your information. In another section of the Altair newsletter the price for the 8K BASIC was given as $500 and the Extended BASIC was $750 for non-members. As you can see, the price drops rather sharply if you own an Altair 8800. And, if you own an 8800 you should be receiving the NL, but at $30 per year for non-owners we would be somewhat hesitant to recommend it (although it is a very nice publication). Some of the features of the NL include frank discussions of some of the "boo-boos" MITS may have made so that owners can get them straightened out; introduction to the MITS Service Department; software tips (which includes quite a bit on their new BASIC); new products & price lists; a software contest; maintenance contracts; questions & answers; and etc. (in case we've overlooked anything).

Another interesting paragraph in the NL mentioned that if you own a Mark-8 or a Shelby (?) or an M16 National Computer and you would rather have an Altair 8800, then MITS will offer you $150 on a trade-in.

4K Altair BASIC Language

STATEMENTS		COMMANDS	FUNCTIONS
IF...THEN[1]	DATA	LIST	RND
GOSUB	LET[2]	RUN	SQR
RETURN	DIM	CLEAR[7]	SIN
FOR	REM	SCRATCH	ABS
NEXT	RESTORE		INT
READ	PRINT[3]		SGN
INPUT	STOP		
END			

NOTES: [1]IF...THEN can be followed by a statement. Example: IF A<5 THEN PRINT B
[2]LET is optional in variable assignments. Example: A=5 is identical to LET A=5
[3]TAB(X) within PRINT statement tabs to print column X.
[7]CLEAR deletes all variables.

FEATURES

Multiple statements per line, separated by a colon ":" (72 characters per line)
Approximately 750 bytes available for program and variable storage before SIN or SIN, RND or SIN,RND, SQR are deleted.
"@" deletes a whole line and "←" (or underline) deletes last character typed.
Direct execution of any statements except INPUT.

Two character error code and line number printed when error occurs.
Example: ? US ERROR IN 50 would indicate a reference to an undefined statement in a GOTO, etc., during execution of line 50.

All results are calculated to at least six decimal digits of precision.
Exponents may range from 10^{-38} to 10^{37}.
Maximum line number of 65535.

8K Altair BASIC Language

STATEMENTS		COMMANDS	FUNCTIONS	
IF...THEN[1]	DIM	LIST	COS	POS
GOSUB	REM	RUN	LOG	RND
RETURN	RESTORE	CLEAR[7]	EXP	SGR
FOR	PRINT[3]	SCRATCH	TAN	SIN
NEXT	ON...GOTO	CONT[8]	ATN	ABS
READ	ON...GOSUB		INP[4]	INT
INPUT	OUT[5]		FRE[9]	SGN
END	DEF[6]			
DATA	STOP			
LET[2]				

NOTES:
[1]IF...THEN can be followed by a statement. Example: IF A<5 THEN PRINT B
[2]LET is optional in variable assignments. Example: A=5 is identical to LET A=5
[3]TAB(X) within PRINT statement tabs to print column X. SPC(X) prints X spaces
[4]INP returns status of a hardware I/O channel.
[5]OUT sets status of a hardware I/O channel.
[6]DEF allows for single variable single statement user defined functions.
[7]CLEAR deletes all variables.
[8]CONT continues program execution after Control C or STOP.
[9]FRE returns number of free bytes for program or variable storage. With a string argument, FRE returns amount of free string space.

FEATURES

Multiple statements per line, separated by a colon ":" (72 characters per line)
Approximately 2K bytes available for program and variable storage before ATN or ATN, COS, SIN, TAN are deleted.
"@" deletes a whole line and "←" (or underline) deletes last character typed.
Multi-dimensioned (up to 255) arrays for both strings and numbers.
Direct execution of any statements except INPUT.
Two character error code and line number printed when error occurs.
Example: ? US ERROR IN 50 would indicate a reference to an undefined statement in a GOTO, etc., during execution of line 50.
Control C -- interrupt program (prints BREAK IN LINE XX)
Control O -- toggles suppress output switch
All results are calculated to at least six decimal digits of precision. Exponents may range from 10^{-38} to 10^{37}.
Maximum line number of 65535.
AND, OR, NOT operators can be used in IF statements or formulas.
STRINGS
Maximum length = 255 characters
String concatenation (A$ + B$)
String functions:
LEN -- length of string.
ASC -- returns the equivalent ASCII decimal number for the specified argument.
CHR$ -- truncates the numeric formula to an integer, interprets the integer as a decimal number, and converts it to its equivalent ASCII character.
RIGHT$, LEFT$, MID$ -- Return substrings of specified string formulas; beginning at leftmost character (LEFT$) or ending at rightmost (RIGHT$) or beginning at specified position (MID$) of the string formula, and containing the number of characters specified by the numeric formula.
STR$ -- number converted to a string.
VAL -- string converted to a number.

MITS Operating System
(Package I)

The operating system is designed to facilitate assembly language program development on an ALTAIR 8800 with at least 8K bytes memory and a serial I/O board (for either teletype or COMPTER I/O).

The system monitor, which resides in the first 1K of memory, enables the user to load and execute programs stored on paper tape or other external device. The user can also write device drivers coded to suit his own particular I/O needs. Programs loaded and executed under monitor supervision can be passed parameters to control their operation.

The text editor provides facilities for editing a source program (usually assembly language) read in from an external device. The program is stored in an area of memory during the editing process and is written back out to an external device when editing is complete. The user can insert, delete or replace lines in the text buffer.

The assembler reads a source program from an external device and converts it into binary form in the ALTAIR's memory. Input can be read from any device, including the teletype keyboard. A second pass of the source can be made to generate an assembly listing. The assembler itself occupies approximately 3K of memory.

For the development of small programs, the monitor, assembler and text editor can be resident at the same time eliminating the use of external I/O for the storage of the source program on paper tape, etc.

A debugging package, DDT-8800, will be available in June.

SOFTWARE PRICES

NOTE: The software prices listed on your price sheet are incomplete. This is the complete, updated software price list.

ALTAIR 4K BASIC.....
Altair customers who have purchased an Altair 8800, 4K of memory, and one I/O board (Serial, Parallel, or audio-cassette)...ONLY $60.00
If teletype or terminal (CT256 or COMTER II) is also ordered.....N/C

NOTE: You can order software when you order hardware or you can order it later. Special prices apply to all Altair customers.

ALTAIR 8K BASIC.....
Altair customers who have ordered an Altair 8800, 8K of memory and one I/O board.....ONLY $75.00
If teletype or terminal (CT256 or COMTER II) is also ordered.....N/C

ALTAIR EXTENDED BASIC.....
Altair customers who have ordered an Altair 8800, 12K of memory and one I/O board.....ONLY $150.00
If teletype or terminal (CT256 or COMTER II) is also ordered.....N/C

ALTAIR PACKAGE ONE (assembler, text editor, system monitor).....
Altair customers who have ordered an Altair 8800, 8K of memory and one I/O board.....ONLY $30.00

ALTAIR DOS (Disk Operating System).....
When purchased with 88-DCDD.....n/c

4K BASIC, 8K BASIC, EXTENDED BASIC AND PACKAGE ONE available on paper tape (8 level) or audio cassette. Specify when you order.

DOS available on paper tape, audio cassette, or disk. Specify.

ALL SOFTWARE INCLUDES DOCUMENTATION. BASIC LANGUAGE COURSE SOON TO BE AVAILABLE (there will be a charge for this).

specifications, prices subject to change. also delivery.

Altair Extended BASIC Language

Extended BASIC has all the features of the 8K BASIC plus:

1. PRINT USING for formatted PRINT statements
2. DISK I/O (to ALTAIR floppy disk)
3. Double precision (13 digit accuracy) add, subtract, multiply, divide.

A minimum of 12K is required to support Extended BASIC. The first release of Extended BASIC is planned for July, 1975. The 4K and 8K BASICs are available today. Many more features, such as integer variables (16 bits) and ELSE clauses in IF statements, are scheduled for future implementation.

MICRO-8 COMPUTER USER GROUP NEWSLETTER
HAL SINGER & JOHN CRAIG - EDITORS
CABRILLO COMPUTER CENTER
4350 CONSTELLATION ROAD
LOMPOC, CA 93436

JUNE 27, 1975
VOLUME 1, #8

WE RUSHED ANOTHER ISSUE OUT IN A HURRY BECAUSE BOTH JOHN AND I H AVE COMMITTMENTS COMING UP IN JULY. I HAVE TO TRAVEL TO SACRAMENTO FOR A THREE WEEK NATIONAL SCIENCE FOUNDATION INSTITUTE ON TEACHING A PRE-ENGINEERING COURSE IN THE HIGH SCHOOL. JOHN WILL SOON BE STARTING A SERIES OF TRAINING COURSES.

EVERYONE THAT ORDERED BACK ISSUES SHOULD HAVE RECEIVED THEM BY NOW. IF YOU DIDN'T EITHER WE MESSED UP OR THE POST OFFICE DID. PLEASE LET US KNOW IF YOU ORDERED AND GOT MISSED. SORRY ABOUT THE PRINT QUALITY ON 1-4 REPRINTS. THE REDUCED FORMAT MAKES COPY QUALITY VERY CRITICAL AND ALL I HAD TIME TO DO AT THAT TIME WAS TO DUMP PAPER TAPES ON TO OUR FAST PRINTER.

CARL HELMERS OF M.P. PUBLISHING CO., BOX 378, BELMONT, MA 02178 HAD THIS TO SAY IN A RECENT LETTER. "JUST A PAGE, TO INFORM YOU OF THE DEMISE OF ECS MAGAZINE AND - LIKE A PHOENIX FROM IT'S MAILING LIST ARISEN - T HE BEGINNING OF 'BYTE'! I GOT A NOTE IN THE MAIL ABOUT TWO WEEKS AGO FROM WAYNE GREEN, PUBLISHER OF '73 MAGAZINE' ESSENTIALLY SAYING HELLO AND WHY DON'T YOU COME UP AND TALK A BIT. THE NET RESULT OF A FOLLOW UP IS THE DECISION TO CREATE BYTE MAGAZINE USING THE FACILITIES OF GREEN PUBLISHING INC. I WILL END UP WITH THE EDITORIAL FOCUS FOR THE MAGAZINE, WITH THE BUSINESS END BEING MANAGED BY GREEN PUBLISHING.

THE IDEA OF THE MAGAZINE IS TO PROVIDE A FORUM FOR IDEAS AND COMMUNICATIONS ON THE "HOME BREW COMPUTER" THEME AND ITS PRACTICAL AP-PLICATIONS FOR GAMES, AS AN AID TO SMALL BUSINESS AND PROFESSIONAL PEO-PLE'S NEEDS, AND FOR THE NON-PRACTICAL HARDWARE-HACKERS WHO BUILD THINGS AND LET THEM SIT ON THE SHELF. THE FORUM IS THE MAGAZINE, AND ITS SUSTAINANCE COMES FROM A COMBINATION OF SUBSCRIPTIONS AND ADVERTISE-MENTS. THE SUBSCRIPTION PRICE WILL BE $10 FOR A CHARTER SUBSCRIBER PER ANNUM, AND $12 FOLLOWING THE INITIAL "TURN ON" TRANSIENTS. ECS MAGA-ZINE SUBSCRIBERS WILL BE SERVICED ON A TWO FOR ONE BASIS FOR THE REMAIN-D ER OF THEIR PRESENT SUBSCRIPTIONS. INDIVIDUAL COPIES WILL SELL FOR $1.50."

HAL NOVICK CALLED ABOUT A MONTH AGO WITH THE NEWS THAT THEY DID GET THE SELECTRIC TYPEWRITER TERMINALS THEY WERE BIDDING ON. I ORDERED ONE AND F OR $275 DELIVERED PRACTICALLY TO THE DOOR, I GOT A BEAUTIFUL I/O SELECT-RIC TYPEWRITER IN A PRETTY CASE WITH A 8 LEVEL PAPER TAPE READER ON ONE S IDE AND AN 8 LEVEL PAPER TAPE PUNCH ON THE OTHER IN VIRTUALLY PER-FECT OPERATING CONDITION. NOT ALL OF THEM WERE QUITE THAT GOOD BUT I THINK ITS THE BEST BUY WE HAVE SEEN YET IN A HARD COPY PRINTER. ONE STILL HAS TO SOLVE THE ASCII TO SELECTRIC AND VICE VERSA CODE CONVERSION BUT IT SHOULDN'T BE TOO HARD WITH THE NATIONAL $22 ROM AVAILABLE. THEY HAVE SOLD OUT ON THE FIRST BATCH BUT ARE GOING TO GO AFTER MORE. SO THEY W ILL KNOW HOW MUCH MONEY THEY HAVE TO WORK WITH THEY ARE GOING TO ASK FOR REFUNDABLE DEPOSITS IN ADVANCE IF YOU WANT TO RESERVE ONE. WRITE HAL AND ENCLOSE AN SASE IF YOU'D LIKE FULL DETAILS.

HAL NOVICK, 2810 HENDERSON COURT, WHEATON, MD 20902
(301) 933-7453 OR (703) 920-7200 HE SUGGESTS CALLS BE MADE PERSON TO PERSON.

DR. KEN MCGINNIS SENT THE FOLLOWING COPY OF A LETTER TO MINI MICRO MART. UNFORTUNATELY, LETTERS ARE COMING IN RAPIDLY INDICATING SIMILAR PROBLEMS. EVERY INDICATION IS THAT MAURY DOES REALLY CARE ABOUT TRYING TO SERVE THE NEEDS OF THE HOBBYIST BUT APPARENTLY HAS SIMPLY TAKEN ON MORE THAN HE CAN HANDLE.

23 JUNE 1975

KEN A. McGINNIS, M.D.
1289 EAST HILLSDALE BOULEVARD
FOSTER CITY, CALIFORNIA 94404

FAMILY PRACTICE

MAURY GOLDBERG
MINI MICRO MART
1618 JAMES STREET
SYRACUSE, NY 13202

DEAR MAURY,

I HAVE RECEIVED YOUR LETTER DATED 6-21-75

1) SHIP MY KEYBOARD ON OR BEFORE JULY 1, 1975 OR RETURN MY CHECK.
2) SHIP MY OTHER PARTS NOW! OR RETURN MY CHECK NOW! I HAVE WAITED MORE THAN 2 MONTHS AND I CAN'T WAIT ANY LONGER.

I MUST STOP PAYMENT IF I HAVE NOT RECEIVED SHIPMENT ON OR BEFORE JULY 7, 1975. IF YOU AREN'T SURE YOU CAN DELIVER BY THAT DATE, JUST RETURN MY CHECK NOW.

I WOULD VERY MUCH LIKE TO ORDER SEVERAL OTHER THINGS IN YOUR FLYER BUT I CAN'T TRUST YOU. I SUPPOSE I'LL HAVE TO FIND ANOTHER SOURCE. THIS I S TOO BAD SINCE YOU SEEM TO CARE ABOUT THE COMPUTER HOBBIEST MARKET.

I AM SENDING A COPY OF THIS TO HAL SINGER

SINCERELY,

KEN

M. PAUL FARR, 3723 JACKSTADT ST., SAN PEDRO, CA 90731 SAYS THAT ORGANIZATIONAL MEETING FOR THE LOS ANGELES HOBBY COMPUTER GROUP WAS A SMASHING SUCCESS. HE ESTIMATES ABOUT 150 PEOPLE ATTENDED. THE FIRST PEOPLE STARTED ARRIVING AROUND NOON AND THE LST DIDN'T LEAVE UNTIL AFTER SIX. A TREMENDOUS AMOUNT OF TALENT AND INFORMATION WAS BROUGHT TOGETHER BUT HOW CAN WE GET USEFUL WORK AND DIRECTION OUT OF SUCH A MONSTER GROUP? PAUL GOT PHIL MORK'S "CHOMP" RUNNING FOR THE MEETING TO MANY PEOPLE'S DELIGHT. HE APPRECIATED THE DISCUSSION ON I/O HANDLERS IN NL#7 A ND SAYS A LOT OF THIS KIND OF THING IS NEW TO HIM AND INDESPENSIBLE IN H IS CONTINUING EDUCATION".

MY NAME IS BILL LEWIS AND I HAVE HAD MY MARK-8 UP SINCE DECEMBER. I HAVE A SWTP TERMINAL AND KB. THE KB SWITCHES HANG UP LIKE EVERYONE ELSE'S, BUT I HAVE PROGRAMMED AROUND IT. AT THIS TIME, I ONYL HAVE 768 BYTES OF MEMERY, BUT IT IS ENOUGH TO HOLD AN OCTAL ASSEMBLER WITH ONE BLOCK LEFT OVER. A FRIEND OF MINE HAS PURCHASED AN ALTAIR 8800 AND IT RUNS FINE(AND FAST) EXCEPT YOU CANNOT LOAD THE STACK. IT ALWAYS SEEMS TO CONTAIN ONES. (BY THE WAY, THE CHIP DOES NOT HAVE INTEL WRITTEN ON IT) YOUR NEWSLETTER HAS HELPED MY UNCOUNTED TIMES AND I WOULD LIKE TO CONTINUE TO RECIEVE IT. I AM ENCLOSING A CHECK FOR $ 6.00.

My mailing address is: BILL LEWIS
6620 N.E. COTTER
KANSAS CITY, MO 64119

From John Craig.....

Ted Lincoln, 410 Bell Avenue, Santa Ana, Calif. 92707, was recently a student in my Varian V-70 Systems course. He has a Mark-8 up and running but is building a new chassis for the boards to convert it to a bus-oriented system. His goal is to build another processor board with an 8080 and be able to just plug it in in place of the 8008. In the truest sense Ted is a computer interface expert. He's responsible for designing interfaces between an aircraft simulator system and about five different computers (Sigma, PDP-11, V-73, Altair 8800, and more). Hopefully, Ted will come up with some neat inexpensive interfaces for you folks with 8080's.
Ted got together with six other co-workers and set up what we consider a pretty good system for getting info on this hobby. Each member of the group subscribes to one of the various newsletters being put out today and they then make copies and exchange them. When you consider that each one of the NL's being put out cost five or six dollars it would be quite a bundle to get all of them. (Save them bucks wherever ya can, folks. They're gonna be needed for peripherals.)

- -

We're terribly sorry the last newsletter was a little late to inform some of the people in the L.A. area about the meeting at Don Tarbell's place on June 15th. (The NL's were returned to us by the Post Office because they were two or three grams overweight...and that is why one edge was trimmed off.) Anyway, Judge Pierce Young and Don Tarbell did a fantastic job on getting the word out. The meeting was attended by 120 people and there was standing room only in the auditorium. Four or five people brought their computers and set them up. There was also some selling and trading going on. A survey form was filled out by all the participants so that a determination could be made regarding the direction for an L.A. club. George Tate (home ph: 663-2604) was given the organization responsibilities and he reports that it looks like the club will be of unlimited size but will have to be broken up into steering committees and there is also the problem of a large meeting place to be resolved. A tentative August meeting is in the works but firm word on that will be forthcoming. Contact any one of the three gentlemen mentioned if you're interested.

- -

Joe Huffman in Corona, California is currently working on design of a Universal Controller using an 8080 microprocessor. His objective is to come up with a controller which can be used for interfacing an 8008 or 8080 with a TTY or TVT, and tape cassette and also be used as a Block Transfer Controller.

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The Amoth Team (father & son) sent us a couple of letters recently totaling 50 pages. One of the sections dealt with Jim Fry's A to D converter and some bugs they discovered. If we could get camera-ready copy of same we'd like to reproduce it in a future newsletter.

- -

If you're planning on starting a Mark-8 soon, you might consider holding off until the next NL. We're going to publish complete plans & wirelists for Tom Boyko's wirewrap version. We can get limited versions of the board for about $10.

ACSNJ NEWS

issue no. 1

June 1975

Amateur Computer Society of New Jersey Newsletter

First ACSNJ Meeting A Success

The first meeting of the ACSNJ was held on Friday night, June 13th at UCTI (Union County Technical Institute) in Scotch Plains NJ. There were 32 people in attendance. The gathering was scheduled for 7-10PM, but people started arriving at 6:30 and some did not leave until the lights were finally turned off at 10:30PM. Here are some of the highlights of the gathering:

Ed LaPlante had his Altair 8800 processor up and running with a demo memory swapping program. Several other Altair owners tried their hands at entering some of their pgms. Several Altair owners complained about slow delivery on extra circuit boards from MITS and non-delivery from mini-micromart.

Bob Silva had his home-built computer terminal on line to the ECN computer located at Rutgers University. They have a fantastic library of pgms (lots of games too) as well as BASIC, FORTRAN, APL and several other languages (all interactive). Bob built his terminal using Don Lancaster's TVT-I for the display and a reworked Univac keyboard with an improved version of Lancaster's ROM encoder circuit. Bob designed the additional circuits for terminal operation (scrolling, CR, LF, UART, etc.) and is using a Bell-103 modem. He plans now to rework the circuit to display 1,024 characters on the screen (64 character/line, 16 lines) to enhance its operation as a terminal(512 characters is just to little for interactive work with a large system)

Bob just graduated from UCTI(electronic technology) and is planning to continue his education for a Bachelor's degree in Florida, so contact him quickly before he leaves the area if you want info on his system.

Norm Compton had his music computer running. It was playing the Beattle's "Yesterday" as well as running through the chromatic scale over 3 octaves. Norm designed and built the system. It uses a 6-bit word stored in a 1024x6 recirculating shift register memory (it was the cheapest way to go at the time this was designed). 4-bits are used to encode the scale and 2-bits for octave and rhythm control. The system is programmed via a switch panel and the memory output. via decoding, controls a VCO. A DAC is used to form harmonic rich musical tones whose harmonic content is controllable via the DAC. The system can play a single-note melody of as much as 1024 notes and elements of rhythm over a range of three full chromatic octaves. The entire unit (incl. power supply) is the size of a music box.

Norm is also a graduate of UCTI and is continuing his education toward a Bachelor's degree at NJIT(formerly NCE).

Between 8 and 9PM we had a business meeting. It was decided to formerly found the ACSNJ and for Sol Libes (that's me) to be the President. It was decided that we should hold monthly meetings (for the present) since things are changing so rapidly. The next meeting is scheduled for Friday July 18th and will be held again at

UCTI. Most attendees found this a convenient meeting point. Rodger Amidon and Marty Nichols volunteered to give a talk on "programming the Altair 8800 versus the Mark-8". Frank Kacerek volunteered to maintain the mailing list on his computer system and run addressing labels as required. It was agreed to start a newsletter (this is the first one) to keep people posted on what is going on in NJ. Information was distributed on other available newsletters, organizations and sources of parts.

31 people completed a 2½pg questionnaire. Here is a compilation of data from them:

CPU's built:	Mark-8	4	
	Altair 8800	5	
	Other	5	
	total	14	(9 are running)
I/O Devices:	TVT-I	4	
	TVT-II	2	
	Suding TVT	2	
	Teletype	3	(2-type 33, 1-Creed)
	Cassette	6	
	Other	1	

Where Do people Live?

NJ counties:	Middlesex	9	NYC	1
	Union	8	Staten Island	1
	Passaic	4		
	Somerset	2		
	Morris	2		
	Essex	2		
	other	3		

Occupations:	Students	9(1-HS, 2-AAS, 4-BS, 2-MS)
	System Pgmmers	4
	Electronic Tech	4
	Self-employed	4
	College teachers	3 (Computer Field Eng. 2
	Electronic Consult.	2
	Mgr in business	2
	other	3

Education:	Tech school	6
	AAS	8
	BSEE	3
	BS(business)	2
	BS(science)	2
	MSEE	2
	MA	1

Free coffee and cookies were provided at the meeting by UCTI. $26 was collected to cover mailing expenses, etc. through the next few months.

A Directory of society members is attached to this newsletter. It should assist members in exchange of info, parts, etc.

I will be out of NJ during JUly and August and Bohdan Lukashewsky has agreed to corrdinate things until I get back. Call him, Marty Nichols, Rodger Amidon or Mike Price for info.

By the way, Mike Price and Fred Holcomb are selling a wide selection of TTL, etc logic. Their price sheet should be in with this mailing.

Remember: Next meeting July 18th. Friday night. 7PM at UCTI
Marty Nichols & Rodger Amidon speakers:"Pgmming Altair Versus Mark-8

See you all in September.....Sol Libes

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David O. Valliere
Chemical Engineer
1806 E. Lawndale Ave., APT. 3
Victoria, Texas 77901
June 22, 1975

I stated in my first letter I am building a system centered around an Altair which I purchased as a PK (partial kit) in march. My system will have 12K of dynamic Ram initially with hopes of adding an equal amount of core in the future. I/O is both local, through a Southwest Tech. TVT which I built from scratch, and remote through a modem. I added a modem with automatic phone answer because I have access to a TTY with paper tape at work. I hope to get MITS extended BASIC on the unit, but not at the prices they are talking. I cannot understand why MITS wants to jeopardize their market position with poor sales policies. I am sure you have heard from many dissatisfied customers.

As I stated in my previous letter I have an extensive workshop and may be able to provide services to other members. The workshop includes silkscreen and photographic facilities for PC board and dress panel production. I presently have a screen made up to print Altair front dress panels. The screen prints a duplicate of the stock MITS front, less the MITS logo, on any material. I have made several for people here in Texas on 1/8 inch gray Plexiglas. For any members building Altairs from scratch these panels add the final touch for a nice looking system. I will supply them complete with predrilled swt. and Led holes for $20.00. For an additional $5.00 I will print any logo a member wants across the bottom in the same location MITS puts theirs. If any one is interested they can order one immediately or write to me and ask for info and photo. I can also supply main and memory boards for Southwest Tech. TVT for $25.00 a set. I hope to have my plating through unit running within a month, any boards supplied before then will not be plated through. If any of the members want a special PC board or screen printed front panels made have them call or write and I'll be happy to help them. I have toyed with the idea of making screens up for the Altair boards but I don't know how much interest there is. If anyone is interested have them call or write. I'm not interested in making a profit from this service, I'm just trying to pay for my workshop.

I also think that some of the members might be interested to know that the major surplus market centers are not always the best place to get some IC's (memories etc.). Some times it is better to deal with Industrial electronic dealers. For example, I am doing business with an Industrial OEM supplier in Houston who is selling 2102's for $3.50 in lots of ten, he also is selling 8080's for$175.00. Everything he sends out he tests before shipping. I believe that the surplus centers are selling new rather then surplus stock for many of the LSI and MSI devices based on the prices they want. Two very cooperative surplus centers that don't advertise are;

Herbach & Rademan
401 E. Erie Ave.
Philadelphia, Pa. 19134

and,

Surplus Center
1000-1015 West "O" St.
P.O. Box 82209
Lincoln, Nebraska 68501
402/435-4366

RICHARD LERSETH, 8245 MEDITERRANEAN WAY, SACRAMENTO, CA 95826 (916)445-7872 OR (916)381-0335 IS AN ASSOCIATE WATER QUALITY ENGINEER FOR THE STATE OF CALIF. DEPT. OF WATER RESOURCES. AS PART OF HIS WORK HE WROTE A FORTRAN IV PERSPECTIVE PLOTTING PROGRAM WHICH HE WILL MAKE AVAILABLE TO THOSE INTERESTED FOR THE COST OF DUPLICATION. HE PROVIDED THE FOLLOWING CROSS REFERENCE FOR NL'S 1-7 AND SAYS IT WAS A ONE PASS COMPILING AND HE PICKED ITEMS IMPORTANT IN BUILDING A COMPUTER SYSTEM BY NEOPHYTES. HE WILL BE TAKING A MICRO PROCESSOR SYSTEMS COURSE AT LAWRENCE LIVERMORE LABS THIS SUMMER AND WILL TRY TO GET AS MUCH MATERIAL OF INTEREST TO THE COMPUTER HOBBYIST WHILE HE IS THERE.

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Southwest Technical Products Corporation
219 W. Rhapsody
San Antonio, Texas 78216

May 5, 1975

Dear John and Hal,

Don Lancaster has forwarded me a copy of your April 15 edition. This is a nice newsletter. Should be very helpful to all of the computer freaks who are getting into their own machines. Note that several of your readers didn't appreciate Don's upside down keys on the KBD-2. We were also less than thrilled with this, but it wasn't possible to correct it for the cost we wanted to have in the kit. Also note that some folks had problems with the strobe pulse. This is not due to insufficient debouncing, but is caused by slow rise time. This was noted on prototype TVT-2 units. Correction was easy here. Since strobe pulse went into a 7400 gate, we simply replaced the pack with the new "Schmidt Trigger" gate pack - 74123.. Presto no more problem.

We are now in production on a new keyboard kit, KBD-3. This has a one chip MOS encoder (AY5-2376) which gives you a typewritter style keyboard with all the keys right side up. You also get both upper and lower case, or just upper - selectable. You also get a choice of strobe pulse polarity, jumper selectable. Only problem is that it sells for $49.95. Price reduction should be possible when the encoder chips become less expensive.

Glad to see that most of your readers are happy with the TVT-2. We tried to make this kit as univeral as possible by not forcing anyone to buy features they did not want, or need. I know - it costs too much. Would you be interested in a deal for your subscribers? Since these are the type people that we particularly want to reach, I would be willing to give them a 15% discount on the TVT-2 kit and plug-in units. If you consider this a good deal will be happy to send special order blanks. How many?

We are real interested in just what MITS is up to also. They have a demo truck going around in our part of the country that is due here Friday. Supposed to have an Altair 8800, ASR-33 and diskette system running BASIC. Did you see their ad in the latest Computer Decisions? For only $9, 000 + dollars you can have an Altair with 16K running Super Basic, a printer and a Diskette system. BASIC is "FREE" with the machine. They got to be kidding. Will let you know what the demo looks like.

Daniel Meyer

Dan

TEXAS COMPUTER CLUB TO BE ORGANIZED

Texas Computer Buff's interested in home computer systems are urged to contact L.G. Walker, Rt. 1 Box 272, Aledo, Texas 76008 --Aledo is in the Ft. Worth, Tx. area----

JEAN PIERRE BERNIER, 1005 AVE GRENOBLE, STE FOY QUE10 CANADA 1-418-653-4282 SAYS: "I HAVE FINISHED THE CIRCUIT TO COMMUNICATE WITH A BIG COMPUTER BY PHONE. AT LAVAL UNIVERSITY THERE IS AN IBM 370 WITH A PL. THEY HAVE AN INTERFACE TO USE ASCII AND TTY 38. IT WORKS ALSO WITH TTY 33 AND MY TVT, BUT WITHOUT GREEK ALPHABET AND SPECIAL APL SYMBOLS. I ADDED A MODULATOR AT 2225 AND 2025 HZ TO COMMUNICATE WITH A TTYP HAVING AN ACOUSTIC COUPLER. I USE THE TTY AT MY LABORATORY AND I CAN CONTROL MY MARK-8 WHICH IS AT MY HOME. I AM SENDING YOU:

1) THE SYMBOLIC DUMP OF MY MONITOR WHICH IS MIL EXCEPT FOR INPUT AND OUTPUT AND SOME OTHER ROUTINES.
2) AN OCTAL DUMP OF THE MONITOR
3) A PAPER TAPE OF THE PROGRAM TO PUT IN THE MARK-8 TO LOAD THE MONITOR AND DUMP IT.
4) A PAPER TAPE OF THE MONITOR
4) A CASSETTE WITH A) BOTH PROGRAMS IN THE 2 MODES: 1270-1070 HZ AND 2225-2025 HZ
B) THE OCTAL DUMP OF THE MONITOR IN THE 2225-2025 HZ MODE.

I CHOOSE THE SLOW (BUT SAFER) 9.09 MS PER BIT TO COMMUNICATE WITH A BIG COMPUTER OR A TTY OVER THE PHONE. I CAN COMMUNICATE OVER THE PHONE WITH ANYONE HAVING A TTY AND AN ACOUSTIC COUPLER. I WILL SEND AT 2225-2025 HZ AND RECEIVE AT 1270-1070 HZ. I CAN THEN SEND THE MONITOR (8 BITS) OR THE OTHER PARTNER CAN CONTROL MY MARK-8 THRU THE MONITOR!!!"

WE WILL TRY TO PRINT SOME OF THE LISTINGS IN THE NEXT NEWSLETTER AND HOPEFULLY COME UP WITH A WAY OF PROVIDING DUPLICATE TAPES AND CASSETTES SOON.

HERE IS A COPY OF THE AD THAT WAS SUPPOSE TO APPEAR IN THE NL BEFORE ALL THE DURA MACH 10 SLECTRIC TYPEWRITER TERMINALS GOT SOLD OUT JUST T O MAKE YOU FEEL BAD AND BECAUSE I'VE GOT A LITTLE ROOM I'VE GOT TO FILL AND I'M OUT OF TIME.

4 SALE Government Surplus I/O Selectric Typewriters

We have eight Dura-Mach 10 machines. Each machine includes an IBM I/O Selectric, paper tape reader, paper tape punch, and some have large carriages. Price -- $225 plus $25 packing & handling plus $25 shipping with any excess packing or shipping to be refunded.

All machines should be presumed to have some defect. All Selectric movements appeared to work however all machines are sold "AS IS". No guarantees, no COD, no credit. Full payment required with order. Please expect a two week delay before shippment if payment is by personal check. Machines in best shape will be sold first.

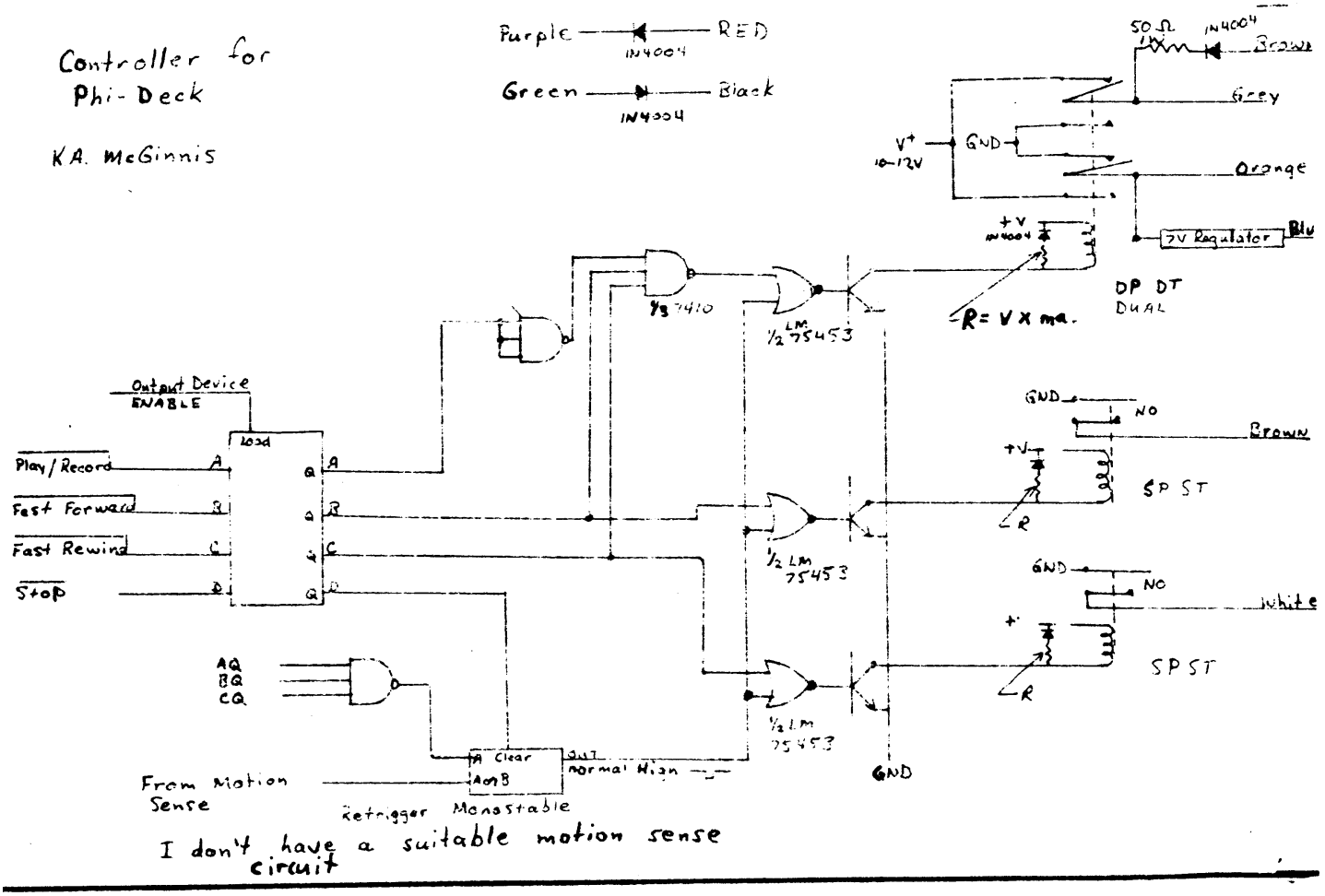
Please note, we are patent attorneys and not in the typewriter business and therefore must impose the above conditions of sale. If there is sufficient interest an attempt will be made to obtain additional units but price will be subject to change.

Shipping will be made by Amtrack or other suitable way. If you have a preferance, please specify. If interested contact:
Hal Novick, 2810 Henderson Court, Wheaton, MD 20902
(301) 933-7453 or (703) 920-7200 (suggest call be made person-to-person)

Due to possible problems, we have scrapped one working machine in order to provide spare parts on a first come, first serve exchange basis. Parts will be provided free to the extent of the supply however please enclose return postage with requests.

Any order received after all typewriters have been sold will be returned immediately.

KEN A. MCGINNIS, MD, PO BOX 2078, SAN MATEO, CA 94401 APPARENTLY HAS BEEN BESIEGED BY REQUESTS FOR INFORMATION ON PHI-DECK CASSETTE TRANSPORTS. HE'D APPRECIATE PEOPLE WRITING DIRECTLY TO: INDIVIDUALIZED INSTRUCTION INC., 1901 N. WALNUT, PO BOX 25308, OKLAHOMA CITY, OK 73105 FOR INFORMATION. HE'S NOT A DEALER AND TO AVOID A TAX MESS, HE'S NOT GOING TO MAKE ANYTHING IF PEOPLE ORDER THRU HIM BUT IF ENOUGH PEOPLE POOL THEIR ORDERS THEY WILL BENEFIT FROM A QUANTITY DISCOUNT. HE WILL ORDER FOR PEOPLE IF THEY SEND $100 PER DECK. HE WILL REFUND ANY UNUSED MONEY PROMPTLY. AFTER HE HAS 50 ORDERS DELIVERED, HE WILL SEND EVERYONE THE QUANITY DISCOUNT. A SIMPLE CIRCUIT FOR CONTROLLING ONE USING THREE CHEAP SURPLUS RELAYS IS INCLUDED. THIS DECK IS SO SIMPLE TO USE, HE THINKS ANYONE COULD MAKE A CONTROLLER BUT HIS ONE BIG PROBLEM IS A WAY TO SENSE END OF TAPE MOTION. HE IS NOW CONSIDERING A CIRCUIT WHICH USES OPTICAL ENCODING TO DETERMINE TAPE POSITION AS WELL AS END OF MOVEMENT.



DAN WINGREN, 2714 1/2 GREENVILLE AVE., DALLAS TX 75206 SAYS THAT HE HAS ONLY RECENTLY LEARNED WHAT "BYOB" MEANS AND I STILL DO NOT KNOW "SASE".

SASE IS "SELF ADDRESSED STAMPED ENVELOPE" DAN AND IS NEARLY A NECESSITY WHEN CORRESPONDING WITH ANY LARGE OUTFIT. THE TIME NECESSARY TO ADDRESS ENVELOPES AND THE COST OF POSTAGE NEARLY GUARANTEES THAT YOUR CORRESPONDENCE WILL BE IGNORED UNLESS YOU DO INCLUDE AN "SASE". YOUR CHANCES ARE GOOD AT LOSING THE DIME YOU SPENT FOR A STAMP STILL BUT YOU MAY GET RESULTS. EVEN RADIO-ELECTRONICS IS REQUIRING THEM NOW IN ORDER TO GET A REPLY TO A LETTER.

M. DOUGLAS CALLIHAN, BERKLEY STREET R.F.D. #1 BERKLEY, MA 02780 MENTION-THAT HE HAD AN ONGOING PHI-DECK CASSETTE TAPE PROJECT AND SENT THESE COMMENTS:

WITH REGARDS TO THE PHI-DECK PROJECT, HERE IS WHERE I AM SO FAR.

1. I AM LETTING THE WISER HEADS DECIDE JUST WHAT FORMAT THE DATA SHOULD BE WRITTEN IN...AT THE PRESENT TIME I AM LEANING TOWARD THE "SUDING-DIGITAL GROUP" CONCEPT...HOWEVER, THE "T.C.H." WOULD BE FINE, EXCEPT I HAVE NOT HEARD FROM THEM. I GAVE THEM MY $6.00 AT THE DAYTON HAMVENTION, AND HAVE WRITTEN TO STEPHEN STALLINGS AND INCLUDED AN SASE AND HAVE YET TO HEAR ANYTHING FROM THEM. I SURE HOPE THEY HAVEN'T FOLDED, AS I WOULD LIKE TO TRY THE CHAMBERLAIN INTERFACE. SO MUCH FOR MY GRIPES!

2. I THINK THAT ANYONE WHO PAYS THE PRICE FOR THE PHI-DECKS SHOULD BE ABLE TO AFFORD A "SEARCH" CAPABILITY. BY USING STEREO RECORD-PLAY BACK HEADS IN THE UNIT, AND RECORDING DATA ON CHANNEL"A" BETWEEN THE BLOCKS ON "A", A PULSE SHOULD BE RECORDED ON CHANNEL "B". IT MAKES NO DIFFERENCE WHAT THE FREQUENCY OF THIS PULSE IS, BUT IT SHOULD BE RECORDED ON THE TAPE BEFORE YOU USE IT FOR DATA. WHAT I AM REALLY SAYING IS THAT THE CASSETTE SHOULD BE FORMATTED ON THE "B" CHANNEL BEFORE DATA IS APPLIED TO IT. TO DO THIS YOU HAVE TO KNOW HOW MANY BITS (OR BYTES OR WORDS) YOU WILL HAVE IN EACH BLOCK. YOU ALSO HAVE TO HAVE A BLOCK NUMBER ON CHANNEL "A" BEFORE YOUR DATA IS ENCODED. I PLAN TO USE A 2.5 INCH INTER-RECORD GAP BETWEEN BLOCKS, FOR START UP AND STOP DOWN. (THIS IS VERY CONSERVATIVE.)

3. AFTER THE "B" CHANNEL IS FORMATTED TO THE USER'S CONFIGURATION, DATA BLOCKS MAY BE WRITTEN ON "A" CHANNEL. SOFTWARE CAN TAKE CARE OF ANY TIMING LOOPS, AND BLOCK NUMBERING ON CHANNEL "A".

4. AS DATA IS READ, FROM CHANNEL "A", THE BLOCK NUMBER IS STORED IN MEMORY. WHEN DATA IS REQUESTED FROM A DIFFERENT BLOCK, A COMPARE IS DONE. IF THE BLOCK NUMBER IS THE SAME, NOTHING HAPPENS BECAUSE THAT BLOCK HAS JUST BEEN READ AND THE CONTENTS SHOULD BE IN MEMORY. IF THE NUMBER IS LESS THAN THE ONE WE NOW HAVE, WE ENABLE THE "TAPE MOVING IN THE REWIND DIRECION, HEAD ENGAGED, SPEED UNREGULATED" (PAGE 31, APPLICATION NOTES FOR PHI-DECK). WE ALSO ENABLE CHANNEL "B" PLAYBACK AMP. WE ARE NOW COUNTING THE CHANNEL "B" PULSES. WHEN WE COUNT THE NUMBER OF B LOCKS + 1, WE STOP THE TAPE. WE ENABLE "TAPE MOVING IN FORWARD DIRECTION, HEAD ENGAGED, SPEED REGULATED" AND WE LOOK AT THE BLOCK NUMBER AND COMPARE TO THE ONE WE WANT. THE "GO TO" NUMBER IS INCREMENTED BY 1 SO THAT WE STOP AT THE CORRECT BLOCK. N+1 IS CORRECT. IF THIS BLOCK NUMBER READ COMPARES WITH OUR N+1 NUMBER, THE THE FOLLOWING BLOCK SHOULD BE THE "N" BLOCK AND OUR SEARCH IS OVER. IF NOT WE COMPARE AND START ALL OVER AGAIN. TO FAST FORWARD SEARCH, OUR COMPARE STEP SHOULD SHOW A BLOCK NUMBER GREATER THAN THE ONE WE ARE AT, AND WE SERACH FOR N BLOCK - 1. THE MICROPROCESSOR DECREMENTS THE BLOCK NUMBER, WE COUNT THE PULSES O N B CHANNEL AND STOP ONE BLOCK BEFORE "N" BLOCK AND READ THE BLOCK NUMB ER ON CHANNEL "A", THEN COMPARE.

MUCH OF THE HARDWARE IS BASED ON 74193'S FOR PRESETING COUNT UP, DOWN AND CONTROLLING THE PHI-DECK TO STOP AFTER CHANNEL "B" COUNTING IS DONE. WITH THIS SYSTEM, I REALIZE 2 INPUT AND 2 OUTPUT PORTS ARE TIED UP--HOWEVER, CONTROLLING UP TO 8 PHIDECKS SHOULD BE POSSIBLE WITH VERY LITTLE MORE TTL. IT SURE IS CHEAPER THAN A DISK SYSTEM AND SHOULD BE GOOD FOR ABOUT ALL THE STORAGE THE AVERAGE HOBBYIST WITH VERY LITTLE MONEY TO SPEND SHOULD NEED. I EXPECT TO USE THIS SYSTEM ON AN 8080 SYSTEM (NOT NECESSARILY THE ALTAIR 8800) BUT IT SHOULD BE APPLICABLE TO 8008 SYSTEMS AS WELL. IT DOES HAVE THE DRAWBACK OF NEEDING 25% OF THE PORTS AVAILABLE TO 8008 USERS. I AM VERY INTERESTED IN ANY AMPLIFICATION ANYONE IN THE MICRO-8 GROUP WOULD CARE TO DO ON THIS SYSTEM.

AS FAR AS NOISE INTERFERANCE IS CONCERNED, IF THE CHANNEL "B" PULSES ARE OF SUFFICIENT DURATION AND LEVEL, THE AMPLIFIER SETTING ON THE CHANNEL "B" INPUT SETTING CAN BE SET LOW ENOUGH THAT ONLY THE ACTUAL PULSES ARE READ, AND POSSIBLY SOME TYPE OF ANTI-NOISE LIMITER COULD BE USE TO FILTER OUT ALL BUT THE ACTUAL PULSES.

I SURE WISH I COULD HEAR FROM THE COMPUTER HOBBYIST PEOPLE!!

IMPROVING THE MARK-8

by Terry F. Ritter
25248 Glen Springs Way
Austin, Texas 78741

Several weeks ago, I mentioned to Hal that I would write up a description of the hardware PUSH/POP stack I had implemented on my Mark-8. At that time the stack itself was fully operational, but I planned further modifications to establish a buss system that would reduce the number of wires between the Mark-8 and and my peripheral breadboard. As it turns out, such a system is not trivial.

It was my intention to extend the Mark-8 data buss (pins 25-18) some ten feet to my breadboard; timing signals would be generated by circuitry added to the Mark-8 CPU board, and be similarly extended to the breadboard. This scheme would appear to allow address data to be latched into the peripheral registers during T1 and T2, as well as making the buss contents availiable during T3 and T4, all on 12 wires (plus power) instead of 26. While I am quite sure that such a system can be implemented, my attempts, using ribbon cable, and standard TTL as line drivers were not successful. Although many timing windows were configured, most giving apparently-suitable waveforms to the distant latches, latched data was rarely correct. It seems probable that transient pulses on the timing lines were latching transitional data, but this is not confirmed. In any case, this simple project quickly got out of hand time-wise, and was terminated prior to success.

For some time, I have been planning some rather complex software systems for my home computer, including a machine-language trace/editing system, and an interpreting language suitable for extensive complex-algebra manipulations. Very soon, however, I became aware of several of the serious deficiencies in the 8008 instruction set. In particular, the 8008 allows no true interrupt service, since it is normally impossible to fully save the processor state at the time of the interrupt and restore it after the interrupt has been answered. There is also no normal access to the program counter or the PC stack. These particular deficiencies are now corrected in some degree with external hardware. In addition, construction of the stack system, as well as other peripherals, implied use of input ports not availiable on the Mark-8. Accordingly, an input-port buss system was developed that made input ports 1-7 availiable on the peripheral breadboard. The presented hardware modifications and additions thus consist of additional input port capability, a PUSH/POP stack designed for interrupt service (including flag latch), and program counter access.

The Input Port System

Since it was desired to place input ports 1-7 on the external breadboard, one approach that seemed reasonable was to place the appropriate data on port 1 input of the Mark-8. This appeared to reduce external complications, since port timing was still accomplished within the Mark-8 itself.

Input data from ports 1-7 is accepted on port 1 of the Mark-8 after modification of the select circuitry associated with IC7, the port-select 7442 on the input board. This modification consists of the addition of seven germanium diodes (which form a seven-input negative-logic OR gate) between the 1-7 outputs of the 7442 and pin 6 of IC6, the 7402 controlling the 8263 input multiplexers.

The input-port structures are configured from six sets of 8-946 quad DTL nand-gates each, with gate outputs in parallel (alternately, 12-7403's could be substituted, with eight pull-up resistors on the common buss). This results in a low-impedence inverted-data buss to the computer, where eight inverters (two more 946's) correct the data into the port 1-7 channel.

On the peripheral board it is necessary to develop signals similar to those to and from our (now modified) 7442 on the input board. This requires all high-address lines (bits 9-15) for development of Den (I/O enable), INPUT, as well as the port-select signals. Six of the 7442 output lines are inverted (complements of one 7404) and used to enable the appropriate input ports (one non-inverted line is used for the POP instruction in the stack, yet to come).

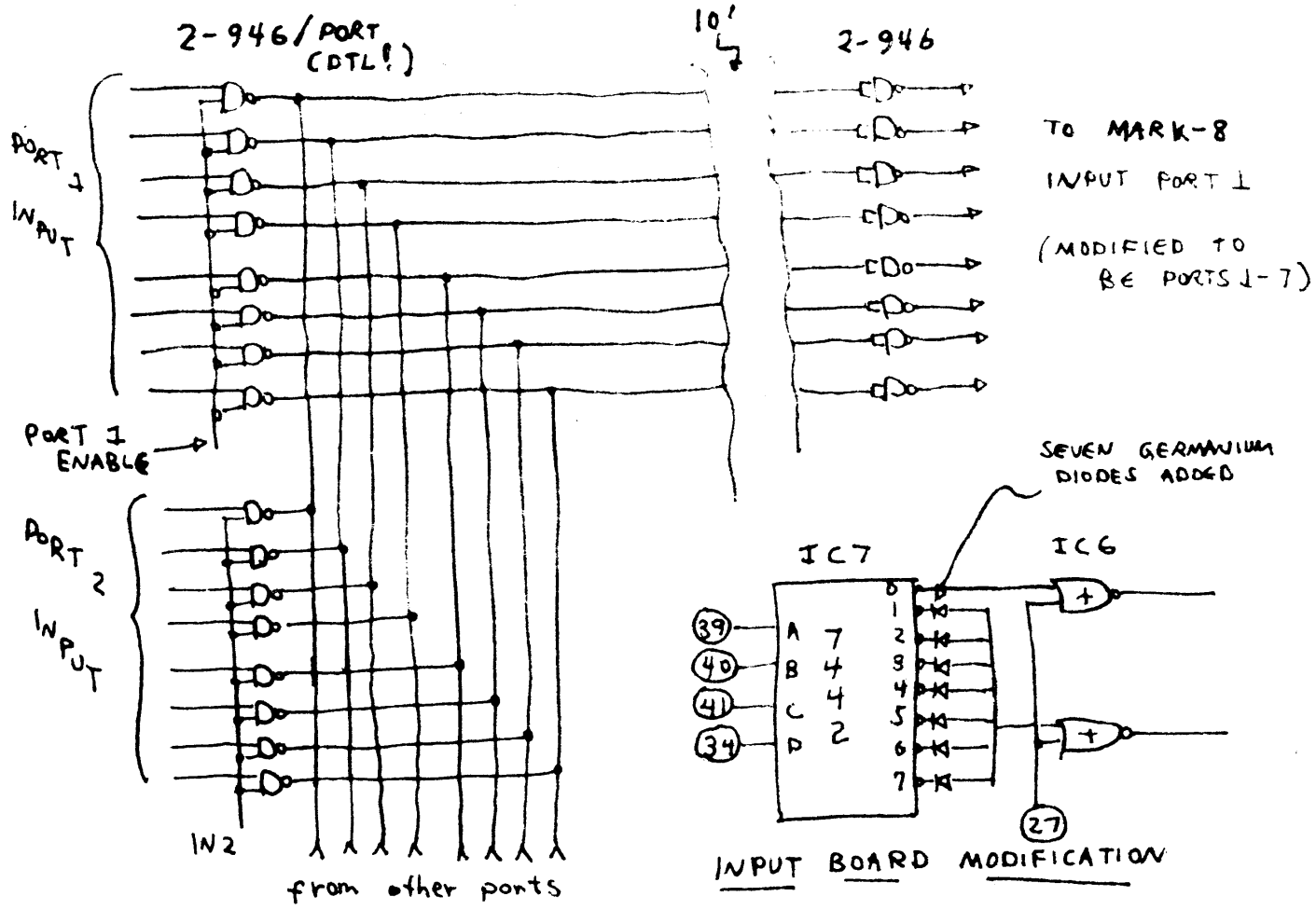
The Hardware PUSH/POP Stack

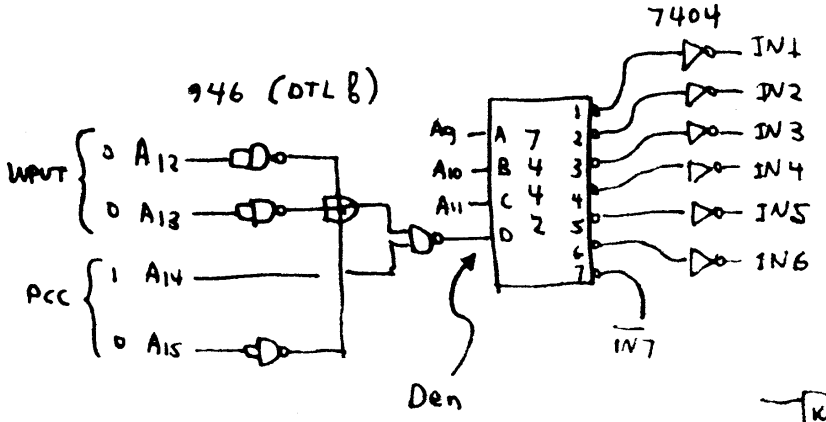
The Push/Pop stack is designed to store the complete status of the CPU prior to execution of an interrupt routine; this includes all registers and flags. Although a software system could be used to identify and store the flags, in this implementation an INPUT 7 instruction causes the flags to be latched externally during what is effectively an OUTPUT-type command (PUSH). These flags are then brought into the accumulator (by another PUSH) and stored on the stack on top of the registers. When status is to be recovered, flag values are easily POPed from the stack and used as an address into a data table in the last sixteen words of a particular page. The appropriate data is then loaded into register A which is added to itself to set the flags to their original values. The registers are then recovered from the stack the accumulator to restore the original CPU status.

The concept for the PUSH/POP stack is taken directly from an article by Tom Pitman writing in Electronic Design for November 22, 1974 (p. 202), although the logic is re-designed for perhaps more-availiable IC's. Two 7489 RAM's are used as a 16-level stack with a 74193 as level-counter. Two 946's (and another diode) provide appropriate timing signals, while a single 7475 latches the flags from the data buss. Timing signals T3 and T4 are required by the stack implementation and are obtained via ribbon-cable from IC17 pin 3 and IC11 pin 10, respectively, on the CPU board. The necessary input commands (IN6 and NOT IN7) are already availiable from the input circuitry. Four data-buss lines are required for the flag latch, however.

The original stack level need not be set to any particular value, since the 74193 is a mod-16 counter and will traverse the stack as a circular list. Hence, the original level-value is meaningless unless it is desired to detect a stack overflow. In the absence of such hardware modifications, of course, it is the responsibility of the programmer not to exceed the stack capacity.

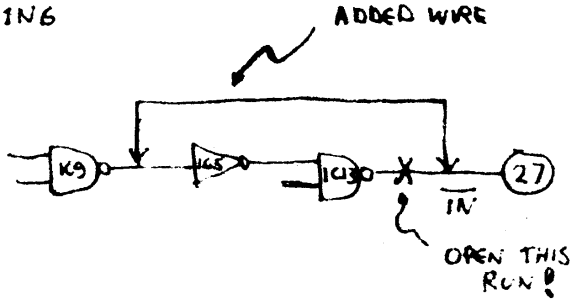
EIGHT INPUT PORTS !!





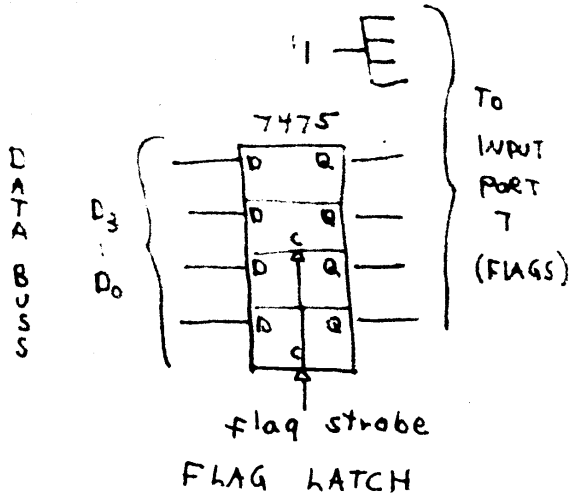
PORT SELECT CIRCUITRY

(on peripheral board)

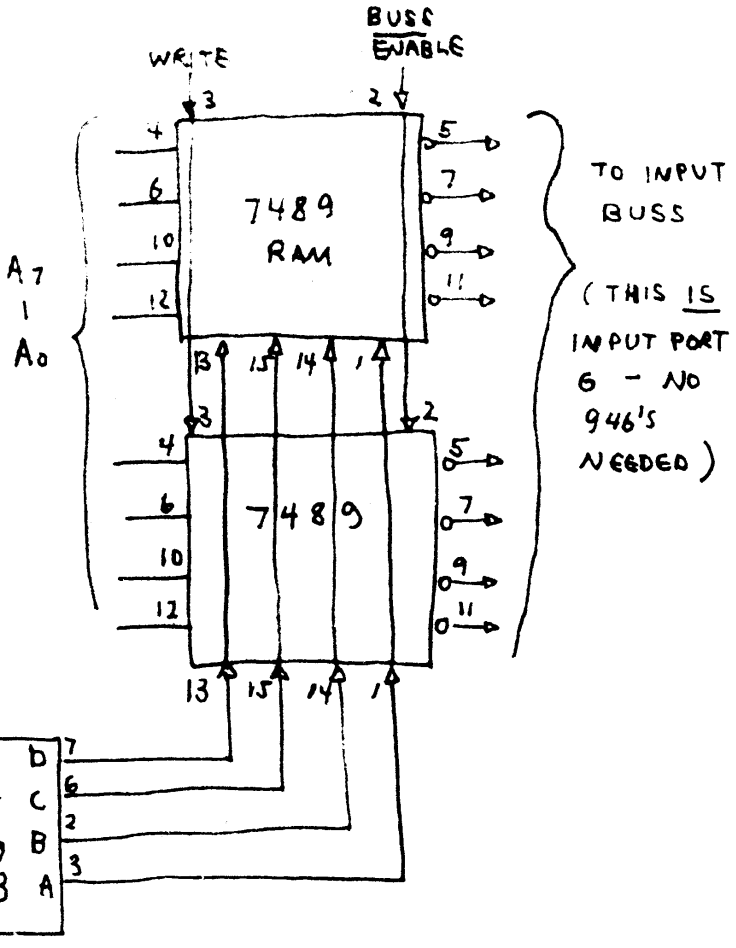


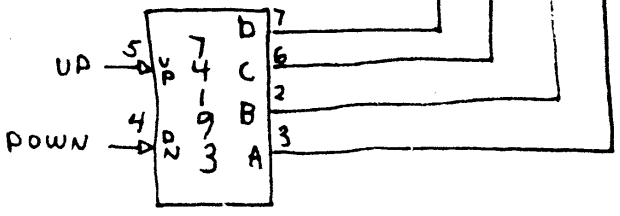
CPU BOARD MODIFICATION

PUSH / POP STACK !



FLAG LATCH





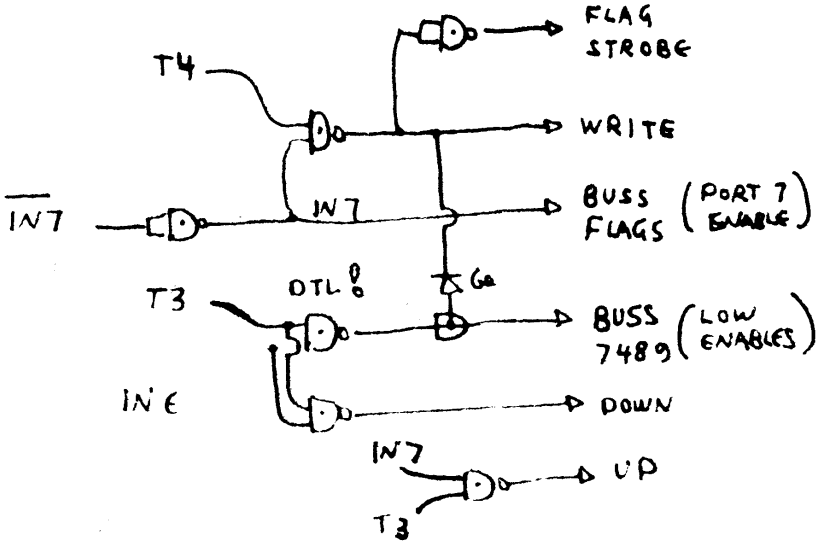
LEVEL COUNTER + STACK

INPUT 7 = 117
PUSH

T1: T1 LATCH ← A
T2: T2 LATCH ← INSTRUCTION
T3: A ← FLAG LATCH
T3→T4: LEVEL ← LEVEL + 1
T4: STACK ← T1 LATCH
T4: FLAG LATCH ← FLAGS

INPUT 6 = 115
POP

T1: T1 LATCH ← A
T2: T2 LATCH ← INSTRUCTION
T3: A ← STACK
T3→T4: LEVEL ← LEVEL - 1



STACK CONTROL LOGIC

Simple Stack Test

```
00 100  301   <-  push
00 101  117       sequential
00 102  010       data
00 103  110
00 104  100   <-
00 105  000
00 106  121   <-
00 107  000       HALT for
00 110  115        display
00 111  104
00 112  106   <-
00 113  000       pop stack loop
```

00 102 can be 011

Simple Flag Recover Test
(needs flag table at 01 360)

change 01 076 for various
flags at 01 104

```
01 075  006
01 076  340   <-  modify at
01 077  200        will
01 100  117
01 101  117
01 102  117
01 103  121
01 104  000   <-  display flags
01 105  250       before save
01 106  117
01 107  117
01 110  121
01 111  000   <-  display
01 112  056       altered
01 113  001       flags
01 114  115
01 115  115
01 116  115
01 117  360
01 120  307
01 121  200
01 122  117
01 123  117
01 124  121
01 125  000       display
                  recovered
                  flags
```

SAVE

RECOVER →

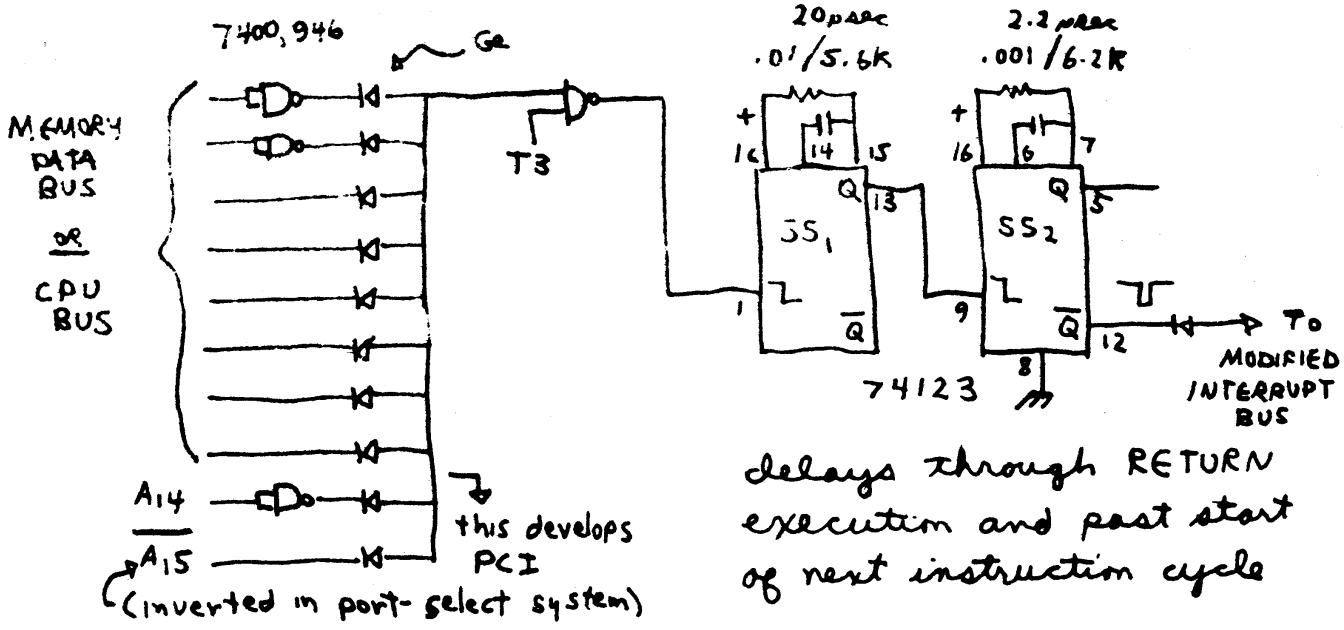
Flag table

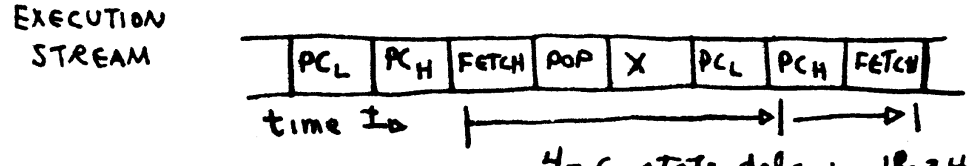
```
01 315  117
01 316  301
01 317  117
01 320  302
01 321  117
01 322  303
01 323  117
01 324  304
01 325  117
01 326  305
01 327  117
01 330  306
01 331  117
01 332  117
01 333  007
01 334  056
01 335  001
01 336  115
01 337  360
01 340  307
01 341  200
01 342  115
01 343  360
01 344  115
01 345  350
01 346  115
01 347  340
01 350  115
01 351  330
01 352  115
01 353  320
01 354  115
01 355  310
01 356  115
01 357  007
01 360  040
01 361  100
01 362  000
01 363  000
01 364  060
01 365  140
01 366  000
01 367  000
01 370  240
01 371  300
01 372  000
01 373  000
01 374  260
01 375  340
01 376  200
01 377  000
```

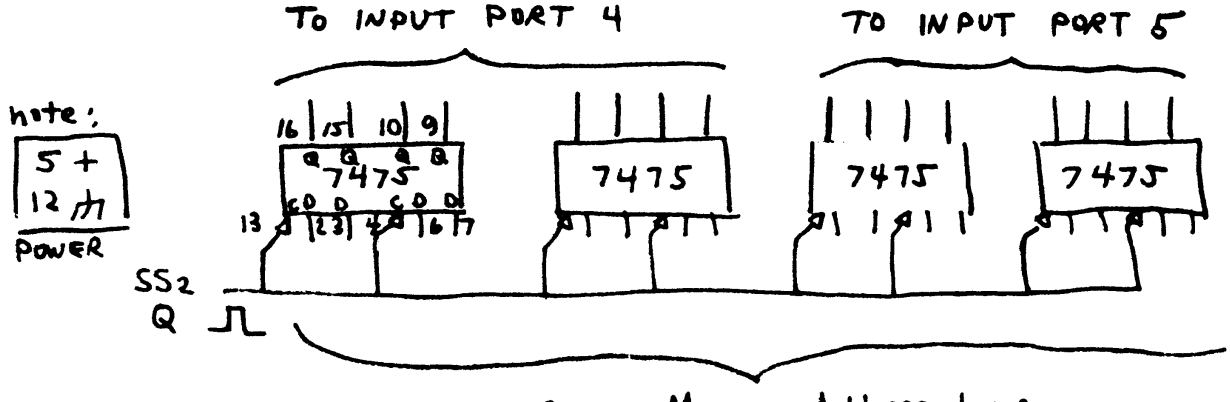
	b_3	b_2	b_1	b_0
'1'	CARRY	EVEN	ZERO	NEG.
'0'	NO-CARRY	ODD	NON-ZERO	POS.

FLAG CONDITIONS

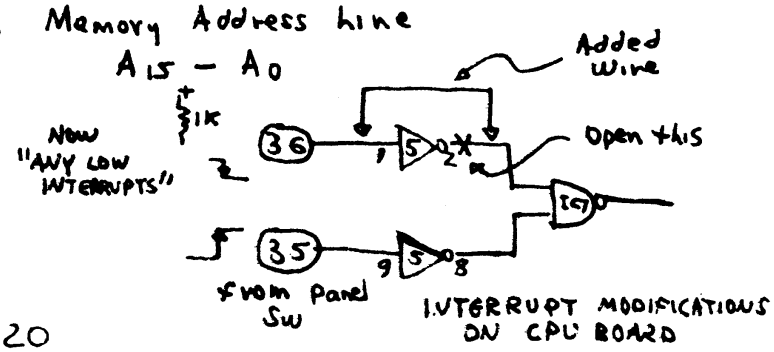
077 = DELAYED AUTO-INTERRUPT AND P.C. ACCESS







THIS HARDWARE SYSTEM SAVES THE PC ADDRESS OF THE LAST EXECUTED STEP OF THE TRACED OPERATION



Program Counter Access

Certain types of programs, in particular TRACE systems, require more than just valid interrupt-handling capabilities; they also may require access to the last value of the program counter before the interrupt. My implementation is to use a special RETURN code to activate a delayed interrupt. As the last instruction of an interrupting system, control passes back to the original program; the delayed interrupt allows one complete instruction to be executed before the interrupting program is again entered. The interrupting program can include octal display of the state of the CPU, or test to determine if display is necessary. Typically, an ASCII SPACE might return processing to the original program until the interrupting program determines that display is again desirable.

Of course, access to a 14-bit address implies that two input ports must be used to regain the data. This paper thus embodies the following input port assignments: 4:PCH; 5:PCL; 6:PUSH; 7:POP.

Back to the Stack

The Stack could alternately have been arranged to store register data without channeling it through the accumulator, by using 3xx ($x \neq 7$) NO-OP instructions. This method would preclude the use of the 3xx NO-OP in a timing loop, although an output instruction could be used instead. But, although register PUSH operations would be quite convenient, POP would still need to come in through the accumulator, and a new software system would be necessary to detect and store the flags in a register, so this method is not as attractive as it first appears.

The POP instruction does not destroy stack data, so repeated POP's may be used to gain access to the stored previous state of the CPU. Of course, 16 POP's are necessary to rotate the stack to its original position. The stack may also be used for temporary storage (for, say, EXCHANGE H,L -type instructions) if care is taken not to overflow the stack and thus destroy stored state-recovery data.

TERRY SAYS THE INCLUDED ARTICLE PLUS HIS OSCILLOSCOPE SYSTEM YET TO COME REPRESENT WELL OVER 2 MONTHS OF SPARE TIME WORK. HE SAYS SARDO IS FAST AT DELIVERING 1702A AND 5314 PROMS AND THEY ARE JUST A LITTLE SLOW (SPEC AT 1.7 MICROSEC) BUT SHOULD WORK OK. MINI MICRO MART IS VERY VERY SLOW AND THEIR BOARD DESIGNER IS JUST PLAIN INCOMPETENT. HE'LL SUPPLY MORE ON THIS LATTER. HE LIKE PARTICIPANT'S ADVICE ON WHETHER THE COMPUTER HOBBYIST AND DIGITAL GROUP NEWSLETTERS ARE WORTHWHILE. HE GETS 20 MAGAZINES PER MONTH NOW BUT WILL SUBSCRIBE IF PARTICIPANTS RECOMMEND THEM HIGHLY ENOUGH.

BILL FULLER, 2377 DALWORTH 157, GRAND PRARIE, TX 75050 AND L. G. WALKER ARE TRYING TO GET A GROUP GOING IN THE NORTH TEXAS AREA AROUND JUNE 30. CONTACT THEM IF YOUR ARE INTERESTED.

TEX'S TOPICS

by Terry F. Ritter
2524B Glen Springs Way
Austin, Tx 78741

On Computer Systems

It is becoming increasingly evident that the usefulness of a computer system is not defined by the CPU chip alone. One system may clearly be superior to another based on the ease of interfacing external systems of various size, control, and power requirements. These external systems may be of such a nature as to logically be considered part of the CPU system, but may necessarily be physically located at some distance from the CPU circuitry. This situation leads to a hodge-podge of wires radiating from the computer chasis proper, a situation that can only get worse, as field developments are not reflected in improved sets of availiable PC boards.

While a powerful bus-structure is clearly important in a useful computer system, there is an obvious trade-off between the number of wires leading to a complex peripheral, and the circuitry needed to transmit the same number of signals on fewer wires. It would seem to me that four uni-directional busses would be worthwhile: a 16-bit address bus, and two busses consisting of 8-bits of data to, and data from the CPU. This would imply a minimum of 32 wires to a moderately-distant peripheral under ideal conditions; systems in a state of flux can get considerably messy.

8008 BASIC?

For some time I have been trying to track down the 8008 BASIC which is rumored to be extant. First, I obtained the IEEE report R75-20 by Weaver, et. al., "A Basic Language Interpreter for the Intel 8008 Microprocessor," which generally discusses the syntactical aspects of the system, but gives no source code, machine code, or other details. Hal probably has the report stuck away somewhere, and perhaps somebody at the University of Illinois in Urbana has some details that we can use.

Then, in the March '75 PCC Newsletter p.21, a letter by Chuck Polisher of Boulder Colorado seemed to indicate that an 8008 BASIC system was availiable from the National Technical Information Service of the US Department of Commerce. But these people replied that the given reference numbers did not correspond to their system, and an enclosed fee schedule indicates that a document search runs $50. So, if you have any firm info on an 8008 BASIC, please get it to me or Hal so we can follow it up and make the system availiable. Thanks.

8008 vs 8080 vs ?

The 8080 chip is far more powerful than the 8008, due to improvement in interrupt handling areas, and instruction microcodes that replace several 8008 instructions with one. It also radically reduces the address multiplexing that makes the 8008 supporting circuitry so complex.

But even the power of the 8008 is just beginning to be felt, and there are several board-sets availiable to support the 8008 -- presently, the 8080 users are generally locked into one system, one supplier. It will be a lot easier to recommend an 8080 system when several appear and their comparitive merits

become apparent. Speed, although highly emphasized as an important factor, is relatively unimportant for experimenters, especially if they are using Dr. Suding's calculator interface design for numerical calculations. (There are several advantages in this, first, all data can be stored in similar formats inside the computer, saving format-conversion systems for I/O to and from people. Second, the many complex functions offered on the interface eliminate not only a floating-point-package, but development of transcendental routines as well, and this is no trivial task.) Although calculations occur inside the calculator chip at P-MOS speed, I/O to and from the calculator chip is quite slow (since the chip was designed for people, blinding speed was not important, and switch de-bouncing and digit-multiplexing was). This means that a slow 8008 may run neck-and-neck with the super 8080 using the calculator interface. The alternative is extensive software systems for the 8080 to allow processing at 8080 speed. But these will probably need to be loaded prior to each session, and may not be availiable anyway.

If the above seems equivocal, it is. There is no best, or even best-value machine right now, things are still in a very early stage for home computer experimenters. But if I had to buy a computer right now, it would not be the Altair, but the MOD-8 system, with its beautiful, beautiful plated-through PC boards.

For the future, there are more and more CPU chips becoming availiable, although they are not cheap enough in onsies to do us much good yet. But the RCA COSMAC may be especially interesting to high-level language designers, due to its unique pointer structure. Further, the same processor may soon be announced in Silicon-on-Saphire technology, increasing its top speed by an order of magnetude. In particular, the COSMAC does not seem to process data internally, but uses sixteen 16-bit internal registers as pointers to data in memory. It is this pointed-to data which is brought in, processed, and retuned to memory; a very fancy system.

Review, Please!

Money and time are things that most experimenters have in short supply, and it does not make a lot of sense for each and every one of us to guess about what we are going to get, or how we will be treated, when dealing with a new device or company. Experimentation is not so competitive that you can't find a couple of hours to type a short review of your transaction. Was delivery prompt? Was the merchandise high-quality? Did the manufacturer respond to your requests for adjustment of faulty or otherwise unacceptable merchandise? Did you deal with a man, or a nameless corporation (I always like to know who I am dealing with)? Do try to be objective. Along these lines, I will shortly present a review of the Mini/Micro Mart calculator interface kit. It will not, unfortunately, be wholly complementary.

PS

I still offer help via SASE to those who need it. Please be specific! And it may take a little while -- things are really piling up around here.

METRICS LABORATORIES
1845 NORTH HOWE STREET CHICAGO, ILLINOIS 60614

1845 N Howe St
Chicago, Ill. 60614
June 19, 1975

Dear Hal Singer...

My husband...not I...is the subscriber to your newsletter. He is the individual in our household who comprehends electronics, logic and that kind of jazz; I don't. Therefore, he finds your newsletter stimulating, valuable & looks forward to receiving each issue--as a substitute for a wife who doesn't understand him when it comes to electronics.

Why am I writing? Because 1) I like him when he's in such a good mood after reading your newsletter...and 2) because I am a professional newsletter (for-profit) editor. We're both scared that comes about the September or October issue, the Micro-8 newsletter may disappear, which we don't want to see happen.

It seems to me that, even for a non-profit venture, the number of pages you are giving per issue, plus the amount of the postage is skinning it pretty damn tight--especially if the renewal money is slow coming in (it always is) at the end of the October term when subscriptions run out. We'd be happy to pay out another $3 to $5 per year to keep Micro-8 coming. You might also consider selling pages of advertising at $10-15 ea. to a few legitimate-but-small businesses interested in this field. This way (or either way), there would be a kitty to pay secretarial costs, etc., any time the burden gets too great...

Our best wishes for the success (continued) of the newsletter & assurances we'll be happy to pay more if you put out a call in the next issue...

Julie Woodman

Julie Woodman

PS Have you run into anyone who is 1) willing to buy programs from MITS in the face of the ferocious contract drawn up by their legal eagles (enclosed) and/or knows anything about copyright law as it relates to programs???

PPS. If you do decide to sell advertising on any basis, please let us know right away; we may have a product of interest to your readers.

You are right, Julie, we do cut it pretty close financially but our effort is to try to provide a service that is unavailable and vital if this hobby computer thing is to get going right, that of trying to get people together. The whole operation is being run as a student body activity thru our high school computer center and although it is probably legal to sell advertising, so far it is just not worth the effort. If is more fun and I think more valuable to be able to pick those items of advertising that seem to be of most interest to the participants. The last few months have seen an enormous increase in the incoming requests for newsletter subscriptions and an enormous decrease in the items submitted for inclusion in the newsletter. We still have our regulars like Terry Ritter, Phil Mork, William Severance Jr., etc. but I can't help think that there are a lot of people out there (with over 800 people that have requested copies of the NL) that have programs and information (especially ALTAIR 8800) that just haven't taken the time to prepare and submit it. A profit making magazine has to generate its own material by paying authors. A newsletter depends on contributions of material from active involved participants. Lack of submitted material would seem more likely to kill the newsletter than financial problems at the present time.

ROGER L. SMITH, 4502 E. NANCY LN., PHOENIX, AZ 85040 (602) 968-0774 WRITES WITH GOOD NEWS FOR BAUDOT TELETYPE OWNERS -- THE ASCII TO BAUDOT CONVERTER BOARDS HAVE BEEN THOROUGHLY DE-BUGGED AND WILL SOON BE AVAILABLE FROM SWTP. WRITE DAN MEYER AT SWTP FOR PRICING. THERE ARE TWO BOARDS, ONE FOR ASCII TO BAUDOT AND THE OTHER FOR BAUDOT TO ASCII. THE BOARDS HAVE PLATED-THRU HOLES AND THE CIRCUITS ARE SUCH THAT THEY WILL FIT EITHER TV TYPEWRITER I, OR TV TYPEWRITER II AND WILL WORK WITH EITHER THE 8008 OR 8080 COMPUTER (WITH OR WITHOUT THE TV TYPEWRITER). HE SAYS, "BELIEVE ME, IT'S REALLY A PLEASURE TO DO AN OCTAL DUMP OF MEMORY TO TTY (IN MY CASE ONE OF BOB COOK'S CREED MACHINES) AND NOT HAVE TO WORRY ABOUT THE ASCII TO BAUDOT CONVERSION! SO, NO ONE SHOULD WORRY ABOUT BUYING A BAUDOT-CODED MACHINE BECAUSE WITH THE ASCII TO BAUDOT CONVERTER BOARD, THE COMPUTER CAN'T TELL THE DIFFERENCE."

ROGER GAVE US PERMISSION TO REPRINT THE SCHEMATICS. ONLY THE ASCII TO BAUDOT ONE IS INCLUDED (THE HARD ONE AND SINCE MOST PEOPLE WILL BE USING A SEPERATE ASCII KEYBOARD, THE IMPORTANT ONE) BECAUSE OF LIMITED SPACE. WE WILL TRY TO GET THE BAUDOT ASCII INTO THE NEXT ISSUE. RE HAS PURCHASED THE DESIGN FOR A FUTURE ARTICLE BUT WHO KNOWS HOW LONG IT WILL TAKE TO GET INTO PRINT.

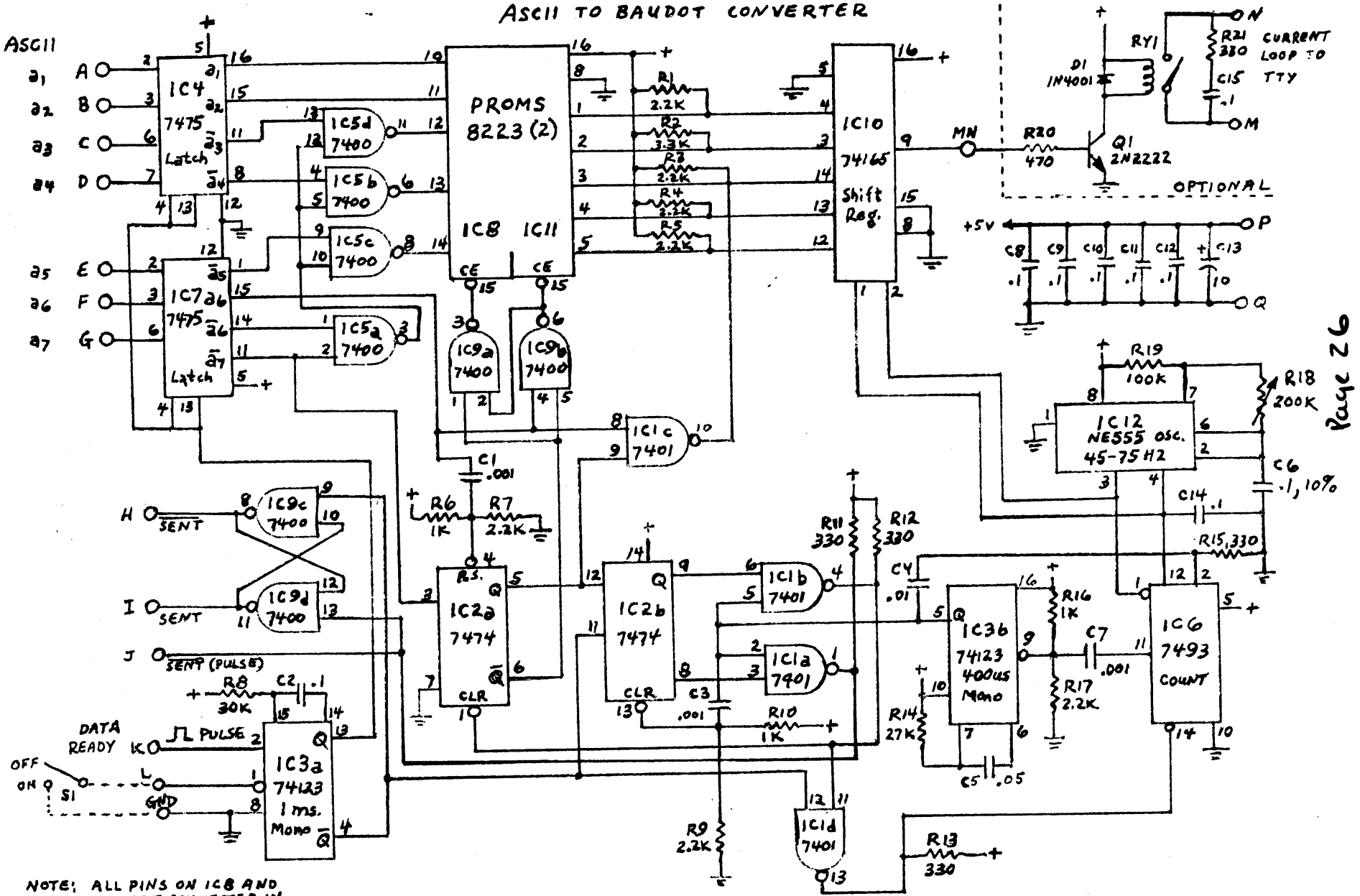
ASCII - BAUDOT CONVERTER 8223 TRUTH TABLES

Word	Input	Output	IC-B Character	IC11 Output	IC11 Character
0_{10}	0_8	00_8		04_8	space
1	1	03	A	15	!
2	2	31	B	21	"
3	3	16	C	24	#
4	4	11	D	11	
5	5	01	E	00	
6	6	15	F	32	&
7	7	32	G	13	'
8	10	24	H	17	(
9	11	06	I	22	)
10	12	13	J	00	
11	13	17	K	00	
12	14	22	L	14	,
13	15	34	M	03	-
14	16	14	N	34	.
15	17	30	O	35	/
16	20	26	P	26	0
17	21	27	Q	27	1
18	22	12	R	23	2
19	23	05	S	01	3
20	24	20	T	12	4
21	25	07	U	20	5
22	26	36	V	25	6
23	27	23	W	07	7
24	30	35	X	06	8
25	31	25	Y	30	9
26	32	21	Z	16	:
27	33	00		36	
28	34	00		00	
29	35	10	CR	00	
30	36	02	LF	00	
31	37	05	BELL	31	?
ALL	XX	37		37	

CAPRILLO SENIOR HIGH SCHOOL

Note: This was transcribed in a hurry, from Roger's old writeup and is subject to errors. Check it and report any bugs. H. Singer

FIGURE 1
ASCII TO BAUDOT CONVERTER



NOTE: ALL PINS ON IC8 AND IC11 ARE CONNECTED IN PARALLEL EXCEPT PINS 15.

SMITH – ASCII/BAUDOT CONVERTERS (Revised)

Micro-8 Computer Group

JAMES G. CALLAS, M. D.
EVELYN R. CALLAS, M. D.
631 NORTH SAN PEDRO ROAD
SAN RAFAEL, CALIF. 94903

Dear Hal & John, 6/15/75

I hope a letter like Bill Fuller's in the #7 NL doesn't discourage you from "bad mouthing" anything that needs it. If he wants to read only rave reviews of the Altair, reading PE will make him feel better.

I bought an Altair too, but only after going over its good and bad points scattered throughout the previous NL's, for which I'm most greatful.

Re your comment that Radio-Electronics may be a joke, there certainly isn't any joke about the thousands of frustrating man-hours that must be wasted because the magazine will never admit a mistake and print a complete correction (corrections, usually incomplete, appear only as letters from the author, implying that it's all the author's fault).

The only joke about it is the money they're missing by not sending out a second book of corrections for $10 to the people who bought the original constructional data for $5. Come to think of it, maybe they would have done just that if you hadn't started the NL.

Regards,
Jim Callas
Jim Callas

P.S.: I didn't like the NL format at first glance, but once in a binder--it's good.

DAVID W. JOHNSTON, PO BOX 3781, WASHINGTON, DC 20007 SAYS THE HEWLETT PACKARD HP-65 PROGRAMMABLE CALCULATOR IS FAIRLY WELL KNOW WITH 11 APPLICATION PACS AND OVER 2000! PROGRAMS ACCORDING TO THEIR LATEST CATALOG. WHAT IS NOT SO WELL KNOWN IS THAT THERE IS AN INTERFACING DEVICE KNOWN AS THE "OPTACON" (TELESENSORY SYSTEMS, 1889 PAGE MILL ROAD, PALO ALTO, CA 94304) THAT PROVIDES AN INTERFACE WITH VIBRATING REEDS SO A BLIND PERSON CAN USE THE HP-65 BY FEELING THE REED'S PATTERN WITH HIS FINGER TIPS. PHOTOTRANSITORS ARE USED TO READ THE CALCULATOR DISPLAY. I WOULD IMAGINE THAT THE OPTACON COULD BE USED WITH OTHER CALCULATORS. IT SEEMS TO ME THAT AN INTERFACE LIKE THIS COULD BE USED TO CONNECT THE HP-65 AND OTHER CALCULATORS TO MICRO AND MINI-COMPUTERS AND SAVE A LOT OF PROGRAMMING AND ALSO MAKE USE OF HP'S OVER 2000 PROGRAMS. REFER TO "HP-65 KEYNOTES", WINTER L975, VOL 1, NO. 3 FOR MORE DETAILS.

Southwest Technical Products Keyboard and Encoder

If you are having trouble locating an ASCII keyboard/encoder and are considering the SWTP kit, execute an immediate interupt and read this first! Having reviewed the specs in their catalog I invested a dollar or so for a phone call to inquire if they had a better keyboard comming up that would include upper and lower case letters. The girl handling my call said no, so I gave my Mastercharge number, and about three weeks later received the kit. (The day after the kit arrived, I received my June issue of Ham Radio magazine and lo and behold the kit I really wanted was prominently featured in the SWTP ad. Strike one.)

Eventhough the construction manual was no more than one sheet and a reprint of the original magazine article, I was not worried as I have had over ten years experience building from construction articles. All the parts plugged nicely on the board until I came to the 52 switches comprising the actual keyboard. Either SWTP got a bargain on misformed switches from the manufacturer or their board driller suffers from depth perception impairments. A ten minute struggle to insert the first switch resulted in a broken switch and a complete recycling of the profanity section of my main core! Each hole required re-drilling, and it still required one hour to insert the first ten switches. (Strike two.) Practise improved the situation, and the remaining fifty-one survivors were installed in another ninety minutes.

SWTP, to eliminate the cost of a double sided board (the Popular Electronics article quoted the board price at $17.50) etched programming jumpers on four strips of pc board. Unfortunately, the board driller must also man the shear for them, since each strip needed about fifteen minutes work with a file to get it to lay flat against the main board.

The next day I decided to inform SWTP of my considered opinion of their kit, and also try and get a replacement switch. After getting my call shunted to four different people (I was paying prime time rates, too!), I was told that I could have a new switch sent to me for $.75. I still haven't gotten the switch, but it has only been a week.

The crowning blow happened tonight when I received my first two issues of the NL. Somebody complained that his SWTP kit puts out a slash when no key is depressed. Having made only a random check of a few characters, I ran down to the basement and set up my keyboard for a test....you guessed it. Has anybody got a cure?

SWTP Keyboard/Encoder: Hope my enclosed comments can prevent others from getting this keyboard. The slash condition is really disturbing since I had planned to use the keyboard inport for my cassette interface inport also . By the time I add a 7475 pair as a latch triggered by the KP pulse and cleared so as to show a '000' octal code output, I will have forked over a lot more money for a lot worse piece of gear than I could have obtained from the surplus market. Also, the mechanical action of the SWTP switches is attrocious. It is virtually impossible to firmly press a key, hold it closed for about $\frac{1}{2}$ second, and then release it without getting another KP strobe and the associated code for a slash up at the output. By the way, my replacement switch finally arrived after the Mastercharge bill had been processed. It took exactly three weeks!! Another local hobbyist was short one switch with his kit. Eventhough he had purchased the TVT at the same time, he was also charged $.75 for the missing switch.

I relay the comments of several friends that are impressed with the no nonsence equipment/supplier reviews. As my company advertises in other magazines, I am well aware that a promise to advertise is usually rewarded with a favorable new product review. Likewise, if no ad is placed, no new product review is published. My partner built the Mark 8 that I am playing with now. I am well on the road to completing my own. He got his up and running, but without any software experience, he got bored and sent it to me. Unfortunately, I made the mistake of telling him about the users group, Digital Group, and TCH. He subscribed to all and now wants his machine back.

Keep up the good work. Your serious efforts will still be needed even after the commercial interests start publishing. (Byte Magazine will debut in August published by Wayne Green of 73Magazine fame)

LEE S. MAIRS, 415 QUINBY ROAD, ROCHESTER, NY 14623 (716)473-6139

HERB NEILINGER, 745 NE 178TH TERRACE, MIAMI, FL 33162 HAS REALLY ENJOYED THE NEWSLETTERS AND IS FINDING A WEALTH OF INFO AND ADDITIONAL SOURCES OF INFO FROM IT. HE HAS AN OPERATING ALTAIR, TVT, AND IS IN THE PROCESS OF FINDING THE BEST CASSETTE INTERFACE BEFORE BUYING IT. HE IS IN THE PROCESS OF DEVELOPING A PROGRAM FOR STOCK AND COMMODITY FUTURE PRICE FORECASTING. HE REALLY CAN'T TEST THE VALIDITY OF THE PROGRAM TIL HE ADDS THE CASSETTE AS HE WILL HAVE TO ENTER DAILY PRICE MOVEMENTS FOR AT LEAST TWO YEARS BACK ON 40 ODD COMMODITIES TO SEE IF THE BUY/SELL SIGNALS ARE REASONABLY VALID BASED ON PAST PRICE PERFORMANCE AND PAST FUNDAMENTAL STATISTICAL INFO. MAYBE IT WILL BE RUNNING IN THREE MONTHS. HE IS SEMI-RETIRED AND MAKES A PRETTY FAIR LIVING NOW FROM STOCK AND COMMODITY TRANDING. HE HAS HAD A HECK OF A PROBLEM WITH MAURY GOLDBERG AT MICRO MINI MART. HIS CHECK TO HIM FOR SOME MEMORIES CLEARED HIS BANK IN APRIL AND AFTER THREE LONG DISTANCE CALLS, ALL HE GETS ARE FLIMSY EXCUSES ABOUT MIX-UPS IN THE HIS ORDER DEPARTMENT, ETC.... SO NO WONDER HE COULDN'T GET MASTER CHARGE TO OK HIM. IN HIS LAST PHONE CALL ON 17 JUNE HE GAVE MAURY TEN DAYS TO DELIVER OR HE'D GO TO THE POST OFFICE DEPT. AND FILE A FORMAL COMPLAINT. HE WOULD LIKE TO KNOW IF ANYONE ELSE HAS HAD THE SAME PROBLEMS. HE SAYS HE BUILT A GREAT CABINET FOR THE TVT AND OCTAL KEYBOARD FROM 1/4" PLEXIGLASS SCRAPS HE PICKED UP AT A LOCAL FABRICATOR. ITS EASY TO WORK WITH (SABRE SAW, DRILLS, SANDPAPER, ETC.). HE USED CORNER BRACKETS INSIDE FOR JOINT REINFORCEMENT AND THE PLASTIC WAS A SMOKEY TYPE WHICH IS SEMI-TRANSPARENT AND VERY SHARP LOOKING. HERB WOULD LIKE TO FIND SOMEONE ELSE TO WORK WITH IN THE MIAMI AREA BUT HAS NOT FOUND A NAME YET IN ANY OF THE NEWSLETTERS.

JOHN D. WITHROW, JR., 233 W. MT. ST., KERNERSVILLE, NC 27184 RESPONDED TO THE POP ELECT. MENTION AND SAYS WE'VE SOLD HIM ON THE MICRO-8 NEWSLETTER. HE IS PARTICULARLY INTERESTED IN THE 8080 AND PLANS A SYSTEM FOR USE IN 1) LARGE-SCALE STORAGE 2) GRAPHICS DISPLAY APPLICATIONS 3) SPEECH SYNTHESIS AND AUDIO RECOGNITION, ETC., ETC., ETC. (HE SAYS HE CAN'T YET SEE THE END OF POSSIBLE APPLICATIONS.) HE PROMISES US SEVERAL NEWSLETTER SUBMISSIONS AND SAYS OUR EFFORTS SEEM TO HAVE EXPANDED SOMETHING LIKE A ROBERT A. HEMLEIN PLOT!! (NOW I HAVE TO FIND OUT WHO ROBERT A. HEMLEIN IS.)

A. J. GREER, 2139 ETHEL PORTER DRIVE, NAPA, CA 94558 RECEIVED A COPY OF NL #6 FROM A FRIEND. HE IS INTERESTED IN MICROPROCESSOR APPLICATIONS TO LABORATORY INSTRUMENTATION, DATA ACQUISTION, AND DATA DISPLAY. AS OF YET HE HAS NOT STARTED CONSTRUCTION OF A COMPUTER AND WOULD BE INTERESTED IN OPINIONS ABOUT WHICH SYSTEM IS BEST. HE HAS MARK-8 INFORMATION AND WANTS TO GET SCELBI-8H INFO. THE ALTAIR IS DEFINITELY OUT OF HIS PRICE RANGE. HE IS INTERESTED IN 2K OR 4K MEMORIES USING 2102'S FOR THE MARK-8. HE IS ALSO INTERESTED IN POSSIBLE MARK-8 INPUT PORT EXPANSION.

ROBERT A. VAN WINKLE, 288 WOODBRIDGE AVENUE, YUBA CITY, CA 95991 (THIS IS AN ADDRESS CHANGE) COMPLIMENTS US ON A FANTASTIC NL #7 AND SAYS HE HAS A THREE PIECE MODEL 28 TTY WHICH HE WOULD LIKE TO GET RID OF. ITS COMPOSED OF THE MODEL 28 PRINTER, THE TAPE PUNCH AND THE TAPE READER AND IF ANYONE IN THE YUBA CITY-SACREMENTO AREA IS INTERESTED, THEY SHOULD CONTACT HIM. PROGRESS ON THE MARK-8 HAS HIT A BRICK WALL IN THE FORM OF CIRCUIT CARDS. HE'S HAVING TROUBLE GETTING THE ARTWORK DONE TO INCLUDE EDGE CONNECTORS. AS SOON AS THEY ARE DONE HE WILL MAKE THEM AVAILABLE. FOR THOSE LOOKING FOR AN ECONOMICAL SOURCE OF EDGE CONNECTORS, ROBERT WOULD LIKE TO RECOMMEND DELTA ELECTRONICS, PO BOX 1, LYNN, MA 01903. THEY OFFER A "RACK OF EDGE CONNECTORS FOR $8.95 PLUS POSTAGE.

ROBERT JONES, 33383 LYNN AVE., ABBOTSFORD, B.C., CANADA, V2S 1E2 HAS THE FOLLOWING TO SAY:

I'D LIKE TO TELL YOU A LITTLE ABOUT MYSELF AND PERHAPS TRY TO CONTACT SOMEONE IN THE GROUP WHO HAS A COMPUCORP CALCULATOR, OR A MONROE (WHICH IS BASICALLY A COMPUCORP "WORK" IN A MONROE CASE).

FIRST, MY MAIN ELECTRONICS INTERESTS WERE DIGITAL LOGIC SYSTEMS DESIGN (THIS IS THE FIELD IN WHICH I SPECIALIZE AND IN WHICH I EARN MY BREAD-AND-BUTTER) AND ELECTRONIC MUSIC, BUT SINCE I BOUGHT A COMPUCORP SCIENTIFIC PROGRAMMABLE CALCULATOR ABOUT 2 1/2 YEARS AGO, MY HOBBY INTERESTS HAVE SWUNG TO MICRO-COMPUTERS. I BEGAN BY TAKING MY COMPUCORP APART, PAINSTAKINGLY TRACING OUT ALL THE PCB BUS-LINES AND DRAWING A CIRCUIT DIAGRAM. UNFORTUNATELY, I FOUND IT EXTREMELY DIFFICULT TO GET ANY TECH INFO FROM COMPUCORP (IN FACT, THEY REFUSED TO RELEASE ANY DATA AT ALL), SO THAT ALTHOUGH I HAD A CIRCUIT DIAGRAM, MOST OF THE IC PINS AND OUT GOING TERMINAL POINTS WERE UNIDENTIFIED. HOWEVER, BY DEVIOUS MEANS, OVER THE YEARS I HAVE MANAGED TO SECURE A COPY OF THE SERVICE-MANUAL AND ALSO OBTAINED ONE FOR THEIR NEWEST MODEL, THE 325 ALPHA. IF YOU HAVE ONE OF THESE MACHINES, YOU MAY WANT TO CONTACT ME. FOR MY OWN PART, I AM STILL ANXIOUS TO TRACK DOWN THE TRUTHTABLES FOR THE VARIOUS IC'S AND ALSO INFO ON COMPUCORP'S LATEST TEST-PROCEDURES SUCH AS HOW TO MANIPULATE INTERRUPTS OR TO JAM DATA DIRECTLY INTO RAM, ETC.

I WAS GOING TO GET AN ALTAIR 8800 AND THEN I READ ABOUT THE NEW MOTOROLA 6800 SERIES AND HAVE ORDERED THE EVALUATION KIT OF 7 CHIPS AND INFO FOR $300. WITH LUCK, I SHOULD GET THESE PIECES WITHIN A WEEK OR SO AND WILL THEN BEGIN TO BUILD MY OWN COMPUTER. MAINLY IT WILL BE A FUN THING, JUST FOR THE JOY OF BUILDING MY OWN COMPUTER TO BEHAVE THE WAY I WANT IT TO (I HOPE!!!), AND THEN EXPERIMENTING WITH PROGRAMMING, ESPECIALLY FOR COMPUTER-GAMES. I AM A NEWCOMER TO COMPUTER TECHNOLOGY AND HAVE A LOT TO LEARN ABOUT VARIOUS ARCHITECTURES, LANGUAGES, AND SO ON, SO FOR SOME TIME TO COME I WILL PROBABLY BE GETTING MORE FROM THE GROUP THEN I WILL BE PUTTING INTO IT.

I HAVE ALREADY BOUGHT THE MARTIN RESEARCH BOOK - WELL, ALMOST BOUGHT IT ANYWAY, AS IT ARRIVED WITH ABOUT 65 PAGES OF TEXT MISSING. I WOULD HAVE THOUGHT THEY'D BE MORE CAREFUL PUTTING TOGETHER A BOOK WHICH COSTS THIS MUCH.

DON'T GIVE UP ON THE NEWSLETTER. AMATEURS LIKE MYSELF NEED SUCH A GROUP OR GROUPS, I SHOULD SAY, AS I'VE TAKEN OUT SUBSCRIPTIONS TO THE COMPUTER HOBBYIST AND THE DIGITAL GROUP'S NL'S AS WELL. I AGREE WITH COMMENTS RE POPULAR ELECTRONICS - - I WOULD MUCH RATHER SEE A CONTINUING SEMINAR ON COMPUTER SYSTEMS, RIGHT FROM THE GROUND UP, THAT THESE THINLY DISGUISED "ADVERTISEMENT" TYPES OF ARTICLES.

WHILE ON THE SUBJECT OF ELECTRONICS MAGAZINES, THE CLOSING ARTICLE OF "RADIO ELECTRONICS" SERIES ON THE TVT II SHOWING HOW TO COUPLE THE UNIT INTO A TV HAS ONE UNLABELLED ARROW ON THE CIRCUIT DIAGRAM. NATURALLY, I WROTE TO ASK THEM WHERE IT WENT. ABOUT 2 WEEKS LATER I GOT A POST-CARD FROM THEM - POSTAGE 13 CENTS - POINTING OUT THAT IN VIEW OF THE HIGH COST OF POSTAGE THEY WERE UNABLE TO REPLY TO MY QUERY REGARDING THE TVT II AS I HAD NOT ENCLOSED A SASE. CAN YOU IMAGINE? IN HALF THE SPACE THIS TOOK UP ON THE POSTCARD, THEY COULD HAVE ANSWERED MY QUERY. IN ANY CASE, IT SHOULD HAVE BEEN OBVIOUS THAT IF ONE READER NEEDED THIS INFO THEN SO WOULD OTHERS, AND THE REPLY SHOULD PROPERLY HAVE BEEN MADE IN A SUBSEQUENT ISSUE OF THE MAGAZINE. SO MUCH FOR COMMON SENSE!!!!!

Suddenly, with about six cheap cassette interface that work known to us, the problem of which one is to become the standard faces us. In a letter to the Digital Group, I asked "What do we do now?" This was their reply. (No information was available on the Computer Hobbyist Magazines unit at that time.)

the digital group

po box 6528
denver, colorado 80206

March 21, 1975

We can understand your concern about setting standards on the cassette interface so as to allow easy program interchanges. Even with Dr. Suding's local influence, several experimenters in Colorado are committed to building their own version of a cassette interface as well as his. A bunch of rugged individualists these experimenters.

The digital group, which, of course, is totally unbiased in its opinions, would like to contribute the following points on the interface situation. (Dr. Suding may contribute his own opinions later.)

Mod-8 - The design looks good but our reservations are the following:

1. The interface software looked good as long as the ROM was going to be available - looks like it will be an orphan at best now and so far we have no information from Mini-Micro Mart that it can be obtained.
2. If you don't have a ROM, then you need 196 bytes of RAM storage for interface software.
3. The level of the volume control of the recorder appears to be a fairly critical adjustment.

Scelbi -

1. Way too many ICs.
2. Too complex and therefore too expensive.

Suding -

1. Costs under $5 in parts (excluding PC board - you can afford a Suding on top of anything else).
2. Requires only 135 bytes of storage - 88 for the write routine and 47 for the read routine. The read routine (Cassette Dumper) can be put in 2 8223's easily.
3. Recorder volume control not critical - if you can hear it playing back (after bypassing speaker cutoff), the computer can understand it. Also very difficult to overload.
4. Tuning the circuit is not critical or particularly sensitive - tuning it using a scope for frequency accuracy is adequate.
5. PC Board and all parts, in various forms are being made available very shortly (see project update) as well as an assembled, tested, and tuned version for those who lack basic test equipment. Prices available soon.
6. Software is currently being distributed on cassette with this interface and, as you know, a great deal more is in the pipeline. About 50 packets have sent out so far.
7. As further verification of the quality of the circuit, we put in a cassette that was binding severly and had a great deal of audible wow - it still loaded!

Dr. Suding's comparison of the three cassette systems written on March 22, 1975 follows. Contact Dr. Suding thru the Digital Group.

Unfortunately, every designer views "his design is best", so there will not be perfect agreement. However, "independent judges" should consider the following when selecting a standard.

1. Minimum Software requirement, especially on "Cassette to Memory" (since you have to "key in" this unless on ROM).

2. Simplest Hardware circuitry - Costwise and Tuning.

3. Most Reliable operation - Noise immunity, dropout resistance, speed fluctuation proof, varying signal levels, tone purity.

4. Possible compatibility with other designs.

5. Number in use.

Perhaps your readers would make the best ultimate judges. Have each designer detail the merits of his system, or have an independent party parallel the qualifications. I have included my views on the following sheet.

Regards,

Dr. Robert Suding

COMPARISON OF MONITOR 8 - SCELBI - SUDING CASSETTE SYSTEMS

1. Software Requirements:

MIL - Estimated at 100 bytes to Read
Maybe 150 bytes to write
(Certain routines are called but not listed.)

SCELBI - 104 bytes to Read
60 bytes to write

SUDING - 47 bytes to read
87 bytes to Write

Comments: MIL and Suding systems are roughly identical except that Mil includes a parity bit. The Scelbi is totally incompatible with anything. The Suding system requires only 1/2 the amount of manual "cold start" entry to run in the tape, and the programming has been placed on 1 1/2 8223 ROMs for "instant startup". MIL has died, and the MIL ROM (16K) has never been correctly built, only a "defective ROM" with a bad bit (from Maury Goldberg of Mini Micro Mart).

2. Hardware Circuitry:

MIL - Simple circuitry with AM detection of the 6Khz tone.
6 ICs, 1 transistor.
Square Wave output.

Scelbi- Complex circuitry with FM detection of the tones 1.3Khz and 2.6 Khz - Many ICs.

Suding- Simple circuitry with FM detection of the tones 2125 and 2975.
4 ICs.

Comment: The FM detection system of the Scelbi and Suding circuit is vastly superior to the AM detection system of the MIL with regard to noise, dropout, and extraneous signals in general. The tuning of any of the systems is not difficult. The software of either the MIL or the Suding system will operate the Suding hardware. The Scelbi circuit uses harmonic related tones of 1300 and 2600, which would impair the signal/noise ratio of the upper tone. The Suding circuit uses standard teletype frequency shift tones which are harmonically unrelated. The 2125 - 2975 tones used by the Suding circuit also allow its use in copying wide shift ham radio teletype signals without modification. The Suding circuit uses a triangular wave, much cleaner than the square wave outputs of the other systems. The Suding circuit is being developed as a PC Board by Signal Systems of Colorado Springs, Colorado.

3. Reliable operation:

MIL - The AM detection system of the MIL is much less problem immune than an FM system. The parity checking circuit does have advantages, but an LRC or CRC system would be even more desirable and could be implemented in any system. However, the parity checking operation requires more "Read Cold Start" storage, meaning more user effort to initially load.

SCELBI- Somewhat higher baud rates are used by the SCELBI system, but the split and combining is wasteful.

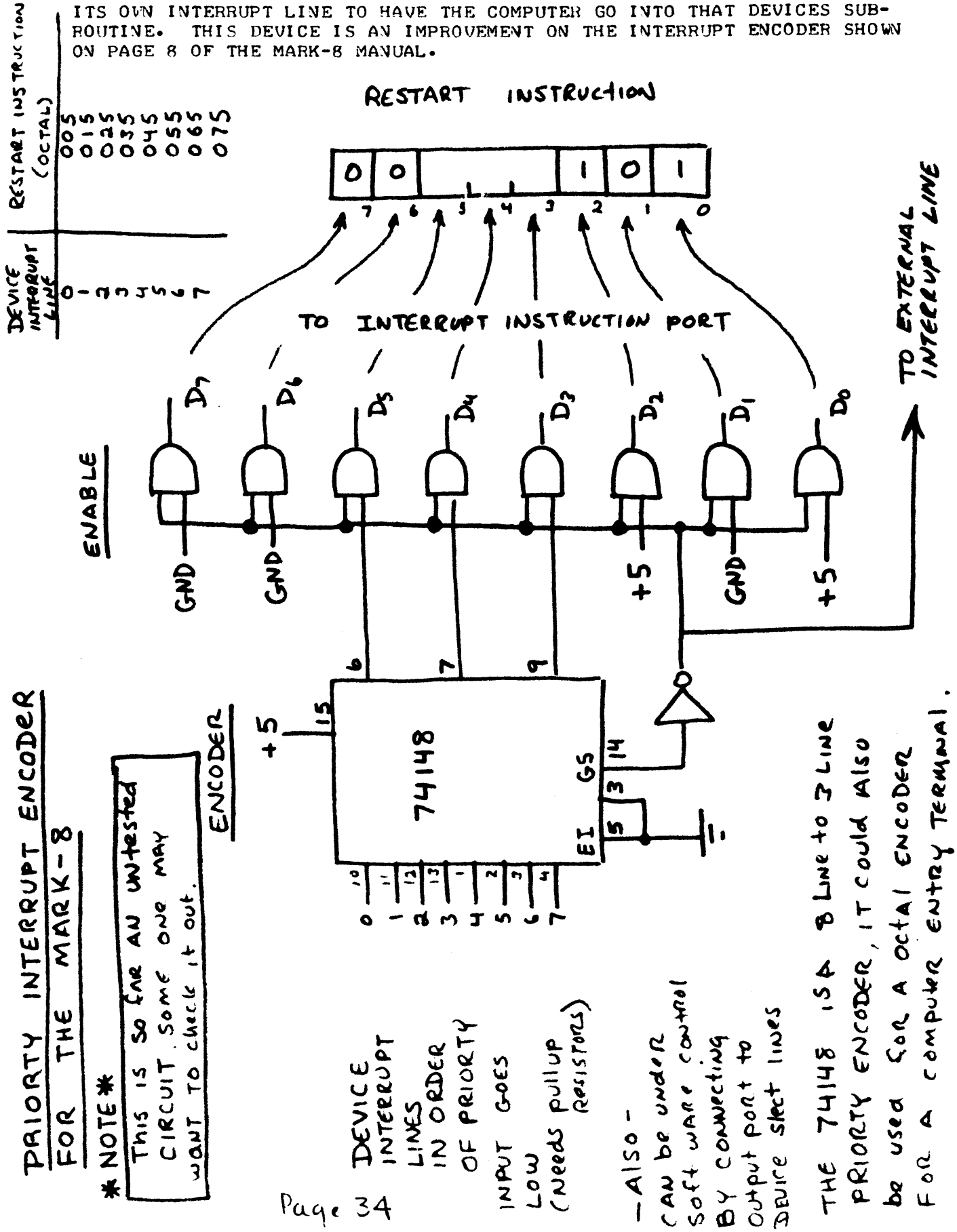
SUDING- Non-standard 400 baud used, but could be increased/decreased under software control. Only load errors that have ever occurred have been due to either very dirty and worn tape head, or very bad tape speed shift due to cassette internal bind or motor slippage.

Comment: It appears all three work, but I feel the Suding system or the Scelbi system have an advantage, at least theoretically, over the MIL.

4. Compatibility - the Suding circuit will work with either MIL software or its own. The MIL hardware requires a strange output logic pulse that could be bypassed to work with the Suding cassette software. Scelbi is not compatible.

5. Number in use - Unknown - 50 people have received a cassette of the Suding software in the 2 weeks since announcement. Feedback included in the requests indicates enthusiasm. All new software developments by Dr. Suding and the digital group will be shipped via cassette.

DEREK DAVIS, PO BOX 628, ANNAPOLIS, MD 21404 SUBMITTED THE FOLLOWING SO FAR UNTESTED PRIORITY INTERRUPT ENCODER CIRCUIT FOR THE MARK-8. AS HE DOESN'T HAVE A MARK-8, HE CAN'T USE IT, BUT MAYBE SOMEONE ELSE WOULD BE INTERESTED. EACH DEVICE WOULD HAVE ITS OWN OPERATING PROGRAM AS A RESTART INSTRUCTION AND ALL THE DEVICE HAS TO DO IS INPUT A LOW TO ITS OWN INTERRUPT LINE TO HAVE THE COMPUTER GO INTO THAT DEVICES SUB-ROUTINE. THIS DEVICE IS AN IMPROVEMENT ON THE INTERRUPT ENCODER SHOWN ON PAGE 8 OF THE MARK-8 MANUAL.



PRIORTY INTERRUPT ENCODER FOR THE MARK-8

NOTE
This is so far an untested circuit. Some one may want to check it out.

ENCODER

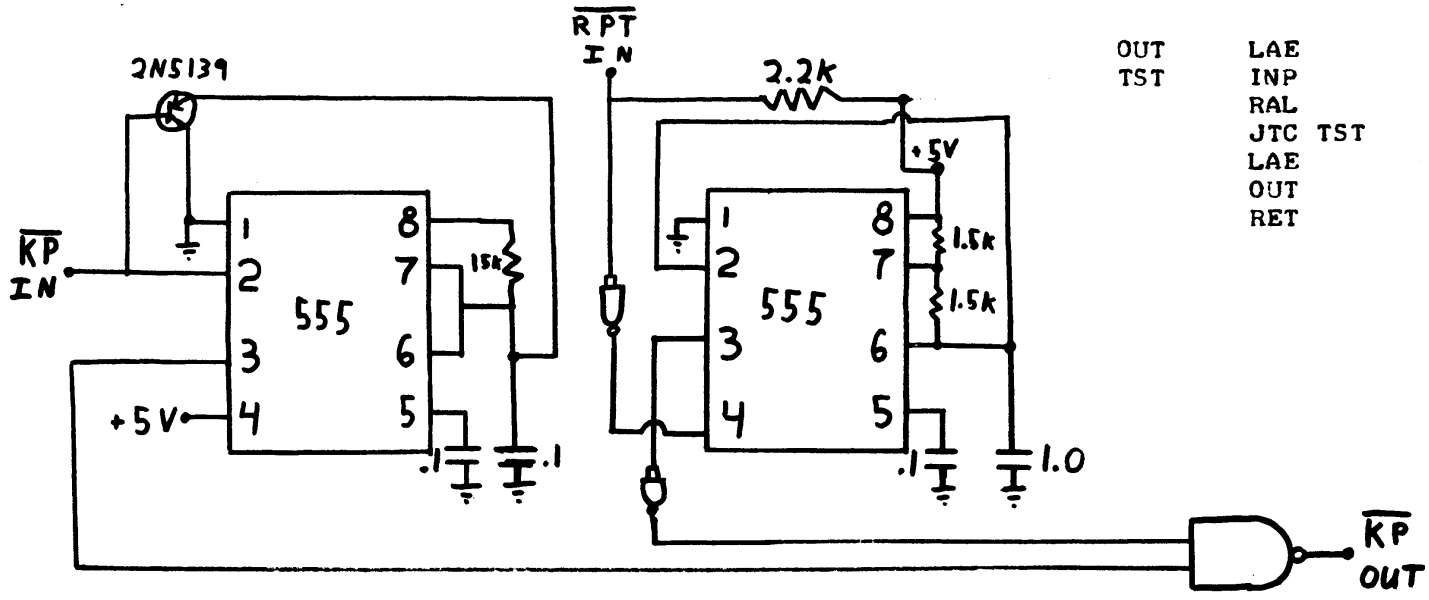
DEVICE INTERRUPT LINES IN ORDER OF PRIORTY

INPUT GOES LOW (Needs pullup Resistors)

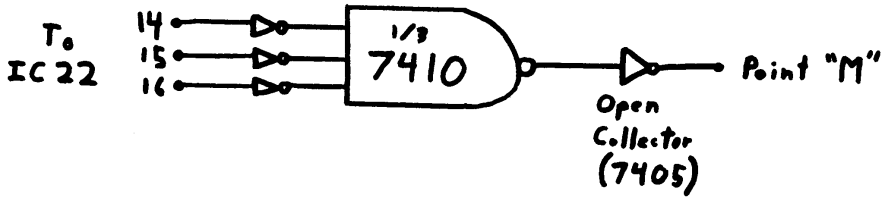
-ALSO-
CAN be under Soft ware control BY connecting output port to Device slect lines

THE 74148 IS A 8 Line to 3 Line PRIORTY ENCODER, IT could ALso be used for a OCTAL ENCODER For a computer entry TERMINAL.

BILL AMES, 3804 MIAMI ROAD, CINCINNATI, OH 45227 SUPPLIED THE FOLLOWING MODS FOR THE SWTP KEYBOARD AND THE TVT-II. ONE OTHER THING ON THE TVT-II: IF OUTPUT IS HANDLED BY TIMING LOOPS, ABOUT 60 CPS OR SO IS THE MAXIMUM RATE. HOWEVER, BY CONNECTING IC-16, PIN 9 OF THE THE TVT-II TO THE UPPER BIT OF AN INPUT PORT (HE USES THE UPPER BIT OF THE KEYBOARD PORT) AND USING THIS SUBROUTINE, THE OUTPUT WILL BE OVER 200 CPS.



Debouncer and repeat key addition to SWTP keyboard.
Connect $\overline{\text{RPT}}$ IN to unused key, other side of key to ground.
The unmodified keyboard is debounced only on leading edge.
With this modification, one clean transition to ground is made, lasting as long as the key is depressed.



Modification to cursor circuitry of SWTP-TVT-II. This curcuit replaces the solid box cursor with single line above the character position, preventing the cursor from hiding a character.

JOHN E. TAYLOR, 2009 NORTH GEYER ROAD, ST. LOUIS, MISSOURI 63131 BELIEVES THAT THE NL'S MAY BE JUST ABOUT THE BEST VALUE IN TERMS OF INFORMATION THAT HE HAS EVER EXPERIENCED. HE IS WAITING FOR THE DUST TO SETTLE BEFORE STARTING CONSTRUCTION BUT WILL PROBABLY START A MIL MOD-8 IF HE CAN GET DELIVERY ON THE MONITOR. AS A PATENT LAWYER, HE WOULD LIKE TO POINT OUT THAT THIS IS A RAPIDLY CHANGING TECHNOLOGY, PATENTS ARE EXPENSIVE TO OBTAIN AND EVEN MORE EXPENSIVE TO ENFORCE AND THAT THE TIMES AND MANY JUDGES DO NOT FAVOR MONOPOLIES OF ANY SORT. THE AVERAGE PERSON MIGHT WELL FIND A BETTER INVESTMENT IN THE STATE LOTTERY. HE IS AGREEABLE TO OFFERING OFFHAND ADVICE AT NOT COST REGARDING PATENTS BY PHONE ONLY AT (314)966-4372 IN THE EVENING.

W. H. BURTNER, RR2, BOX 267, VALPARAISO, IN 46383 SAYS THAT THANKS TO THE NL, HE HAS HAD MANY EHLPFUL REPLIES ON HIS MARK-8 PROBLEMS. HE IS NOW BUSY ADDING DR. SUDINGS ENHANCEMENTS AND CONSEQUENTLY HAS THE MARK-8 STREWN ALL OVER THE HOPE. HE CAN'T WAIT TO TRY THE DIGITAL GROUPS MODS AND SOFTWARE. MARTIN RESEARCH MADE HIM AN OFFER ON THEIR BOOK AT $40 BUT THAT STILL SEEMS HIGH. AFTER A THREE MONTH WAIT, HE FINALLY GOT THE TWO 4K MEMORY BOARDS ORDERED FOR THE ALTAIR. HE SAYS HE CAN'T KICK THOUGH BECAUSE IT TOOK 6 MONTHS TO GET THE PERIPHERALS ON THE RGS KIT. IT SURE IS A DRAG THE WAY THESE SUPPLIERS SHUCK YOU AROUND ONCE THEY HAVE YOUR MONEY. HE COULD SURE USE SOME INFORMATION AND ADVICE ON THE BEST WAY TO PROVIDE I/O FOR HIS ALTAIR. IS ANYONE INTERESTED IN SHARING THE COST ON THE SOFTWARE? HE IS TRYING TO SET UP AN INTERFACE SO HIS CREED TTY CAN BE USED INTERCHANGEABLY BETWEEN THE ALTAIR AND THE MARK-8. APPARENTLY BOB COOK STILL DOES NOT HAVE THE TYPEFACE CHANGES FOR THE CREEDS. MAURY GOLDBERG SEEMS TO ALWAYS BE SO ENTHUSIASTIC ABOUT THE ITEMS HE IS PUSHING AND YET ITS RATHER HARD TO PIN HIM DOWN TO DELIVERY. HE'S GLAD TO SEE SOME IDEAS ARE DEVELOPING WHERE THE MEMORY BOARDS CAN BE SHARED BETWEEN DIFFERENT COMPUTER TYPES AND THE COST IS GETTING INTO A MORE REASONABLE AREA. HE HOPES SOME OF THE BRAINY GUYS CAN COME UP WITH SOME STANDARDIZATION SOON. THERE ARE SO MANY OFFSHOOTS OF, FOR INSTANCE, THE TAPE CASSETTE, THAT ITS BEWILDERING TO SOMEONE NOT IN THE KNOW. P.S. JUST GOT LICENSE AGREEMENTS ON MIT'S SOFTWARE AND APPARENTLY THEY ARE LETTING THE DOLLAR SIGNS SHOW IN THEIR EYEBALLS AND DO NOT INTEND THAT THIS MATERIAL IS TO BE SHARE AROUND. I WONDER HOW MANY FRIENDS THEY THINK THEY WILL MAKE WITH THIS ATTITUDE?

WILLIAM D. THOMAS, 3112 LIS PLACE, HIGHLAND, IN 46322 WOULD LIKE TO INFORM OTHER READERS THAT MINI MICRO MART OF 1618 JAMES STREET MAY NOT BE MAKING THEIR DELIVERIES AS ADVERTISED AND IS ALSO FAILING TO HEED INSTRUCTIONS FOR REFUNDS. HE ORDERED AN ASCII KEYBOARD FROM THEM IN MARCH AND HAS YET TO RECEIVE A REQUESTED DELIVERY OR REFUND WHICH I FINALLY DEMANDED. HE HAS COMPLAINED TO THE POSTAL INSPECTOR IN CHARGE, PITTSBURG, PA 15222 AND YOU MIGHT DO SO ALSO IF EXPERIENCING SIMILAR DIFFICULTIES. HE IS INTERESTED IN 8080 MINIS AND HAS AN ALTAIR THAT HE IS SLOWLY STARTING TO EXPAND. MITS DELIVERY TIMES ARE SO SLOW AS TO BORDER ON THE RIDICULOUS. HE IS LOOKING ELSEWHERE FOR PERIPHERALS.

LAURENCE L. PLATE, 2320 SKYLINE WAY, SANTA BARBARA, CA 93109 FINALLY DECIDED HE HAD TO ABANDON THE MARK-8'S WIRED BUS ARRANGEMENT AND IS NOW INTERESTED IN CONTACTING OTHERS INTERESTED IN WORKING ON A CARD CAGE CONVERSION FOR THE MARK-8 SO WE CAN COMMUNICATE AND EXCHANGE IDEAS. HE IS USING A 26 CARD CAGE SYSTEM WITH 22/22 CONNECTOR CARDS (4 1/2 X 6 1/2) AND HAS ALREADY LAID OUT THE ORIGINAL RE MARK-8 CPU LOGIC ON THE CPU BOARD ON 3 PLUG CARDS. HE WILL SUPPLY FURTHER DETAILS ON THIS WORK AS SOON AS HE GETS ALL OF THE MARK-8 LOGIC WITH THE SUDING MODS LAID OUT. HIS DOCUMENTATION MAY AMOUNT TO ABOUT 100 PAGES OF DETAILED LOGIC DRAWINGS, ETC. HE JUST GOT THE NEW SUDING TVT PRINTED CIRCUIT BOARD WITH THE CHARACTER GENERATOR CHIP AND CRYSTAL. THE BOARD IS REALLY A BEAUTIFUL JOB WITH PLATED THRU HOLES, ETC. HIS ONLY GRIPE IS THAT IT IS NOT THE SAME SIZE AS THE CARDS IN HIS CARD CAGE (IT'S 4 1/2 X 6 1/2) SO HE IS GOING TO INSTALL IT INSIDE HIS NEW TV MONITOR SET SO ONLY THE 8 INTERFACE LINES NEED TO BE BROUGHT OUT. HE INTENDS TO DO EXTENSIVE INPUT MUX REDESIGN AND NEEDS DENSER MEMORY THAN 1101'S OR 2102'S SO IS NOW STUDYING THE AMI S6605BC 4K X 1 CHIP. THEY COST $35 IN UNITS AND $23 IN LOTS OF 100. HENCE ONE CARD IN HIS SYSTEM COULD HOLD 4K MEMORY WITH REFRESH LOGIC, ADDRESSING LOGIC WOULD BE ON ONE CARD SO HE COULD EXPAND TO 16K WITH ONLY 5 CARDS IN HIS SYSTEM. HE WOULD LIKE TO CONTACT OTHERS INTERESTED IN 4K CHIPS.

8008 INSTRUCTIONS

T.A. BOYKO

Function	Accm	B	C	D	E	H	L	MEM
LOAD REGISTER IMMEDIATE	006	016	026	036	046	056	066	076
INCREMENT REGISTER	X	010	020	030	040	050	060	X
DECREMENT REGISTER	X	011	021	031	041	051	061	X
ADD REG to ACC → ACC	200	201	202	203	204	205	206	207
ADD REG to ACC WITH CARRY	210	211	212	213	214	215	216	217
SUB REG from ACC → ACC	220	221	222	223	224	225	226	227
SUB REG from ACC with Borrow	230	231	232	233	234	235	236	237
"AND" REG with ACC → ACC	240	241	242	243	244	245	246	247
"EXCL OR" REG with ACC → ACC	250	251	252	253	254	255	256	257
"OR" REG with ACC → ACC	260	261	262	263	264	265	266	267
"COMPARE" REG with ACC	270	271	272	273	274	275	276	277

LOAD

FROM	Acc.	B	C	D	E	H	L	MEM
ACCUMALATOR	300	310	320	330	340	350	360	370
B Reg	301	311	321	331	341	351	361	371
C Reg	302	312	322	332	342	352	362	372
D Reg	303	313	323	333	343	353	363	373
E Reg	304	314	324	334	344	354	364	374
H Reg	305	315	325	335	345	355	365	375
L Reg	306	316	326	336	346	356	366	376
MEMORY	307	317	327	337	347	357	367	X

STORE

000
001 } HALT
377

LOAD

UNCONDITIONAL		ZERO	$\overline{\text{ZERO}}$	CARRY	$\overline{\text{CARRY}}$	SIGN	$\overline{\text{SIGN}}$	PARITY	$\overline{\text{PARITY}}$
JUMP	104	150	110	140	100	160	120	170	130
CALL	106	152	112	142	102	162	122	172	132
RETURN	007	053	013	043	003	063	023	073	033

Rotate "A" Left - 002
Rotate "A" Right - 012
Left thru Carry - 022
Right thru Carry - 032

PORT	INPUT	OUT 1X	OUT 2X	OUT 3X
0	101	121	141	161
1	103	123	143	163
2	105	125	145	165
3	107	127	147	167
4	111	131	151	171
5	113	133	153	173
6	115	135	155	175
7	117	137	157	177

RESTART (INT.)	
START ADDR.	INSTR.
0X0	0X5

IMMEDIATES WITH ACCUMALATOR

		CARRY
ADD Imm	004	014
SUB Imm	024	034
"AND" Imm	044	BORROW
"EX OR" Imm	054	
"OR" Imm	064	
"COMPARE" Imm	074	

330 Vereda Leyenda
Goleta, CA 93017
June 17, 1975

Dear Hal,

Sorry I missed last meeting in Santa BArbara--this job has too much travel with it. Could you send a copy of the digital graphics oscilloscope display reprint from the MP Publishing paper? Several of us here would like to see it. I'll send it back posthaste.

A new rumor--well, actully its more than a rumor. I talked with Bill Godbout up in Oakland. His company is coming out with a PDP-11 kit in October. It will be a complete 11/10 with cabinet, power supply, front panel, etc. May or may not contain the UNIBUS--they're still negotiating with DEC. Price will be under 1K in kit form, which makes it competitive with the LSI-11. It will come with the basic papertape software--assembler, editor, etc. I don't know any more details except that it will be all TTL, which should make it a llittle easier to fix than the LSI-11. On the other hand the LSI-11 has a better instruction set (11/40), has the front panel simulator, hardwired floating arithmetic, etc. Hard to tell which is best, but if the OEM buy on the LSI-11 falls through this may be a good option. He is reluctant to talk much about it until the thing is on the shelf ready for delivery--says he doesn't want to get the MITS reputation for promising what isn't there. On the other hand it would be nice to let the amateur community know about it. You might give him a call.

The newsletter gets better and better--congradulatons. I will try to get you a copy of the foil pattern for Doug Hogg's scroller before next issue--I'm trying to modify it to scroll on CR, scroll in both directions, allow computer blanking of the screen etc. I've ordered the Edwards Associates "Bugbook" series and will let you know how it looks.

Sincerely,

Jim McCord

Mr. C. Richard Corner
514 So. 9th Street
Moorhead MN 56560

Dear Hal and John:

June 16, 1975

You may have seen the recent advertising campaigns for Intersil's new IM 6100 chip that executes PDP-8 code and the OEM LSI-11 from DEC.

I am interested in getting 100 people to go in on an order for either. The units are expensive, BUT POWERFUL!! We could probably get the IM 6100's for under $200. each, while LSI-11's would be about $650. each. Maybe in 50 lot the LSI-11 could be purchased for $1,000. each.

Maybe people that feel they can afford this (after all, a lot of your readers have spent over $4-500 for lesser systems) would write to me. I will request deposits when I have encugh responses to justify doing so, and will negotiate with the manufacturers. I have already phoned Intersil and talked with the IM 6100 product manager.

You're doing a great job on the Newsletter. The Vol. 1 #7 format is GREAT!

Very truly yours,

C. Richard Corner

WE HAD A PAGE LEFT OVER SO ROGER SMITH'S BAUDOT TO ASCII CIRCUIT IS INCLUDED. SORRY, WE DON'T KNOW WHAT IS IN THE ROMS.

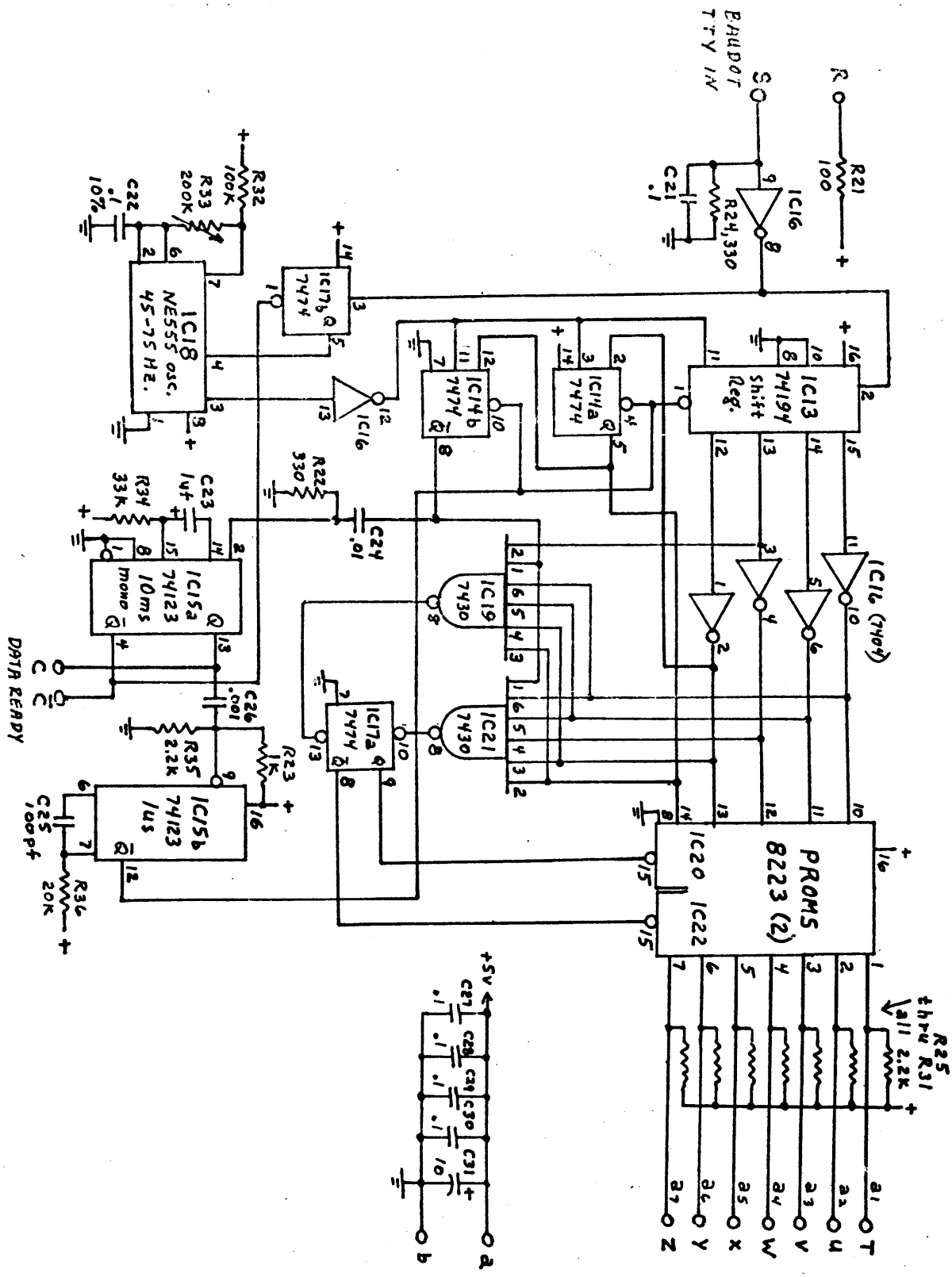


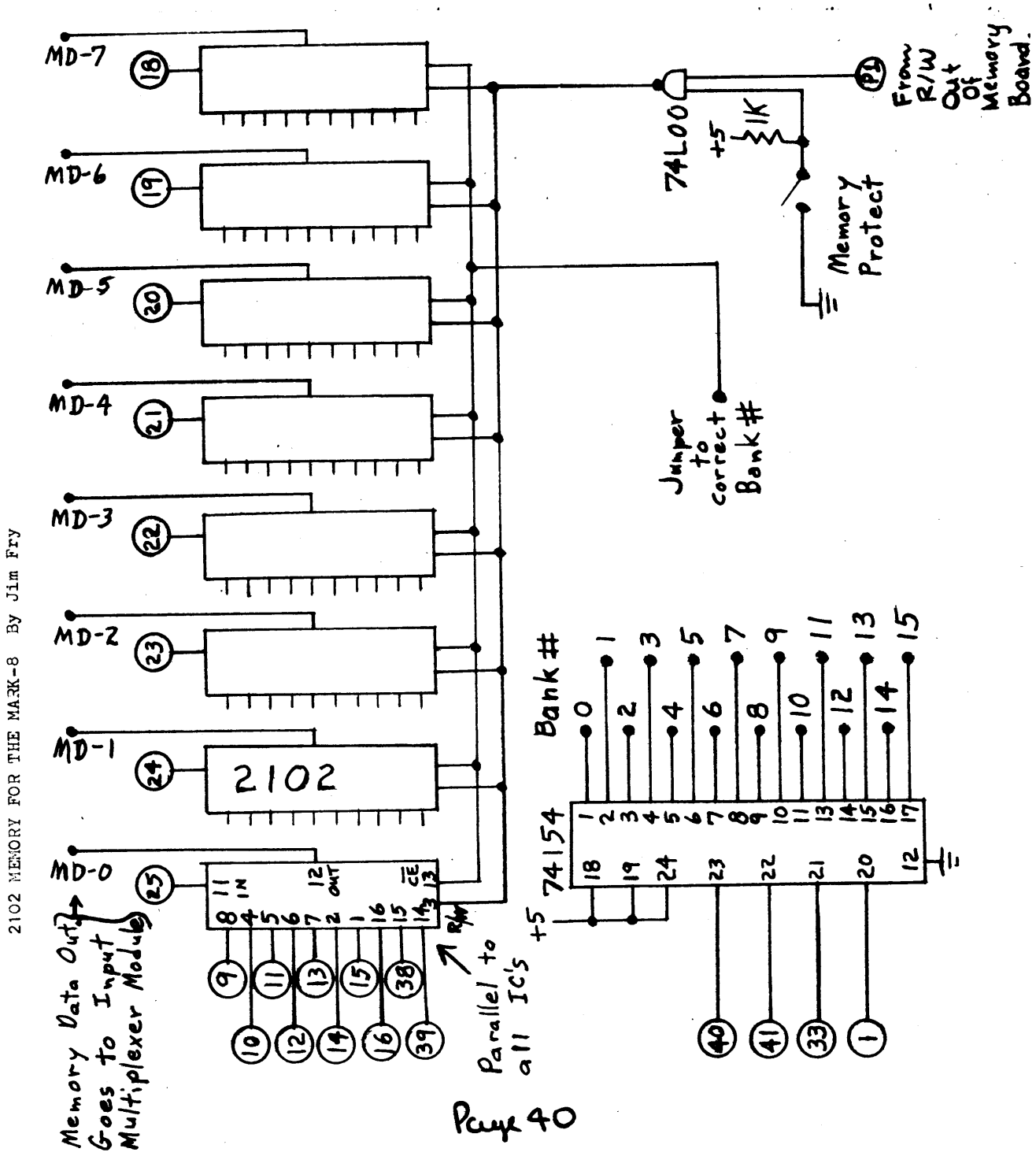
FIGURE 6

BAUDOT TO ASCII CONVERTER

SMITH - ASCII/BAUDOT CONVERTERS Page 15 REVISED

JIM FRY, DIGI-TEL ELECTRONICS, PO BOX 6585, TOLEDO, OH 48316 DESIGNED A CIRCUIT AND LAYED OUT A PC BOARD FOR A 1K 2102 MARK-8 BOARD. HE IS NOW LOOKING FOR A COMPANY THAT CAN ETCH IT FOR HIM.

NUMBERS INSIDE CIRCLES REFER TO MARK-8 BUSS NUMBERS. POWER CONNECTIONS ON THE 2102 ARE +5 TO PIN 10, AND GROUND TO PIN 9. CLOSE MEMORY PROTECT SWITCH FOR ERASE PROTECTION. DISTRIBUTE 8 .1 UFD CAPACITORS AND 2 100 UFD CAPACITORS ON POWER LINES. ONE 74154 CAN PROVIDE HIGH- 4 BIT DECODIN FOR ALL 16 K OF MEMORY. IN PRACTICE THO IT WILL PROBABLY BE EASIER TO USE ONE 74154 FOR EACH BOAARD OF 4K WORDS. WORST CASE POWER CONSUMPTION OF 2K OF 2102 IS 1 AMP. THIS MEMORY DESIGN MUST BE USED IN CONJUNCT ION WITH AN 1101 BOARD. WHEN USING THIS DESIGN IN CONJUNCTION WITH THE ORIGINAL 1101 BOARDS, PROPER DECODING CAN BE OBTAINED ON THE 1101 BOARDS BY CONNECTING A "BANK" SELECT OUTPUT OF THE 74154 TO PINS 9 AND 10 OF IC 34 IN PLACE OF THE #41 BUSS. IN OTHER WORDS BREAK THE FOIL BETWEEN BUSS LINE 41 AND IC 34 AND ATTACH A "BANK" SELECT LINE TO IC34. INSTALL T HE JUMPER IN THE "ONES" POSITION ON ALL 1101 BOARDS. A BANK CONSISTS OF 4 PAGES OF MEMORY.



Computer Glossary

The beginner in this hobby computer thing is hopelessly snowed by all of the technical words and acronyms that people keep throwing around. It's difficult to communicate without using some of them. Motorola published the following microcomputer glossary and I've added some of the terms people have asked me about. Motorola welcomes your suggestions for additional terms and suggested definitions. Send them to Motorola Semiconductor Products, PO Box 20912, Phoenix, AZ. 85036. Your name will be put on a mailing list to receive future editions.

ACCUMULATOR A temporary storage register associated with a processing unit.

ADDRESS A character or group of bits that identifies a particular part of storage, or some other data source or destination.

ALGORITHM A prescribed finite set of well defined rules or processes for the solution of a problem in a finite number of steps: e.g., a full statement of an arithmetic procedure for evaluating sin X.

ALPHANUMERIC Pertaining to a character set that contains letters, digits.

ARITHMETIC AND LOGIC UNIT A part of a microcomputer that performs arithmetic operations, logic operations, and related operations. (An ALU is part of the MPU chip circuitry).

ASCII American Standard Code for Information Interchange. The standard code, using 7-bit coded characters (8 bits including parity check), used for information interchange among data processing systems, communications systems, and associated equipment.

ASSEMBLER A computer program used to translate a machine language program from a symbolic language program.

ASYNCHRONOUS COMMUNICATIONS INTERFACE ADAPTER (ACIA) A general purpose programmable interface between the MPU and asynchronous I/O.

BAUD A unit of signalling speed equal to the number of discrete conditions or signal events per second. For example, one baud equals one bit per second in a train of binary signals.

BENCHMARK PROBLEM A problem used to evaluate the performance of hardware or software or both. A problem used to evaluate the performance of several microcomputers relative to each other, or a single microcomputer relative to system specifications.

BINARY-CODED DECIMAL NOTATION (BCD) A binary-coded notation in which each of the decimal digits is represented by a binary 4 bit number; e.g., in binary-coded decimal notation that uses the weights 8-4-2-1, the number "twenty three" is represented by 0010 0011 (compare its representation 10111 in the pure binary system.).

BOOTSTRAP An existing version of a program that is used to establish another version of the program. A technique or device designed to bring itself into a desired state by means of its own action, e.g., a machine routine whose first few instructions are sufficient to bring the rest of itself into the microcomputer from an input device.

BRANCH In the execution of a microcomputer program, to select one from a number of alternative sets of instructions. A set of instructions that are executed between two successive decision instructions.

BYTE A binary element string operated upon as a unit (normally 8 bits) and usually shorter than a computer word.

CENTRAL PROCESSING UNIT (CPU) A unit of a computer that includes circuits controlling the interpretation and execution of instructions.

COMPILER A computer program used to translate a program expressed in a problem oriented language into a computer oriented language.

COMPUTER NETWORK A complex consisting of two or more interconnected computers.

CONTROL UNIT Coordinates all units of a computer in a timed, logical sequence.

CYCLIC REDUNDANCY CHECK CHARACTER (CRCC) A character used in a modified cyclic code for error detection and correction.

DATA FLOWCHART A flowchart that represents the path of data in the solving of a problem, and that defines the major phases of the processing as well as the various data media used.

DATA PROCESSING The execution of a systematic sequence of operations performed upon data, e.g., handling, merging, sorting, computing.

DATA PROCESSOR A device capable of performing data processing, such as a desk calculator, a punch card machine, or a computer.

DATA SIGNALLING RATE In communications, the data transmission capacity of a set; the data signalling rate is expressed in bits per second.

DEBUG To detect, to trace, and to eliminate mistakes in microcomputer programs or in other software.

DIRECT MEMORY ACCESS (DMA) The process of obtaining data from storage, or of placing data into storage, directly and not depending on the usual flow of data through the processor.

DUMP To write the contents of a storage, usually from an internal storage to an external medium, for a specific purpose such as to allow other use of the storage, as a safeguard against faults or errors, or in connection with debugging.

DUPLEX In communications, pertaining to a simultaneous independent transmission in both directions.

DYNAMIC Refers to the finite storage time of charge within certain MOS circuits that depend on device capcitance to store information, and the need to constantly refresh or recharge these data locations. Contrast with static.

EMULATE To imitate one system with another, primarily by hardware, so that the imitating system accepts the same data, executes the same prorams, and achieves the same results as the imitated system. Contrast with simulate.

EXbug™ Motorola tradename for EXORciser's firmware which minimizes the time required to develop users' programs.

EXORciser™ Motorola tradename for a systems development tool for evaluation of M6800 prototype hardware and software in its actual working environment. As the name suggests, the EXORciser "casts out" problems within the prototype system.

EVALUATION MODULE An evaluation system to check the operating characteristics of Motorola's M6800 microcomputer family of parts.

FIFO First in, first out. A queuing technique in which the next item to be retrieved is the item that has been in storage for the longest time.

FIRMWARE Software in hardware form. Example: Computer program in read only memory.

FLOWCHART A graphical representation of the definition, analysis or method of solution of a problem, in which symbols are used to represent operations, data, flow, equipment, etc.

FORTRAN (Formula translation). A programming language primarily used to express computer programs by arithmetic formulas.

GENERAL PURPOSE COMPUTER A computer that is designed to operate upon a wide variety of problems.

HARDWARE Physical equipment used in data processing, as opposed to computer programs, procedures, rules, and associated documentation. Contrast with software.

HYBRID COMPUTER A computer using both analog representation and discrete, or digital, representation of data.

INDEX REGISTER A feature to provide programming flexibility by providing additional addressing modes.

INSTRUCTION In a programming language, expression that specifies one operation and identifies its operands, if any.

INTERRUPT An external event that causes the computer to shift its attention to another problem.

I/O Input-output

JUMP A departure from the normal sequence of executing instructions in a microcomputer.

MACHINE LANGUAGE A language, that is, a set of characters, conventions and rules used for conveying information, used directly by a machine.

MACRO-INSTRUCTION An instruction in a source language that is to be replaced by a defined sequence of instructions in the same source language. The macroinstruction may also specify values for parameters in the instructions that are to replace it.

MAIN STORAGE Program addressable storage from which instructions and data can be loaded directly into registers from which the instructions can be executed or the data can be operated upon. Usually an internal storage.

MASS STORAGE An auxiliary storage or very large storage capacity used for storage of data to which infrequent reference need be made.

MICROCOMPUTER INSTRUCTION An instruction that can be recognized by the microprocessing unit of the microcomputer for which it is designed. Synonymous with machine instruction.

MICROCOMPUTER PROGRAM A series of instructions or statements in a form acceptable to a microcomputer.

MICROCOMPUTER WORD A sequence of bits or characters treated as a unit and capable of being stored in one microcomputer location.

MICROPROCESSING UNIT (MPU) A unit of a microcomputer that includes circuits controlling the interpretation and execution of instructions.

MICROPROCESSOR Term applied to a semiconductor device for performance of arithmetic, logic and decision-making operations which are directed by a set of instructions stored in a memory device.

MIKBUG™ Motorola tradename for a program which permits communication between the evaluation module and user's terminal.

MNEMONIC SYMBOL A symbol chosen to assist the human memory, e.g., an abbreviation such as "STAA" for "store accumulator A".

MODEM (Modulator-demodulator). A device that modulates and demodulates signals transmitted over communication facilities.

MULTIPLEX To interleave or simultaneously transmit two or more messages on a single channel.

OBJECT CODE Output from a compiler or assembler which is itself executable machine code or is suitable for processing to produce executable machine code.

OFFLINE Pertaining to a device that is not online to the computer but is associated with its operation, i.e., an offline printing station. Pertaining to equipment or devices not under control of a central processing unit.

ONLINE Pertaining to a device under the direct control of a central processing unit, or to a user's ability to interact with a computer via a communication link or terminal.

OPERATING SYSTEM Software that controls the execution of computer programs and that may provide scheduling, debugging, input output control, accounting, compilation, storage assignment, data management.

PERIPHERAL INTERFACE ADAPTER (PIA) Provides a means of interfacing peripheral equipment to the microprocessing unit (MPU).

PROGRAM A series of actions designed to achieve a certain result. Loosely, a routine.

PROGRAMMING LANGUAGE An artificial language established for expressing computer programs.

READ To acquire or to interpret data from a storage device, from a data medium, or from another source.

REAL TIME Pertaining to the performance of a computation during the actual time that the related physical process transpires, in order that results of the computation can be used in guiding the physical process.

REMOTE ACCESS Pertaining to communication with a data processing facility by one or more stations that are distant from that facility.

SIMULATE To imitate one system with another, primarily by software, so that the imitating system accepts the same data, executes the same programs, and achieves the same results as the imitated system. Contrast with emulate.

SOFTWARE Computer programs, procedures, rules, concerned with the operation of a data processing system. Contrast with hardware.

SPECIAL PURPOSE COMPUTER A computer that is designed to operate upon a restricted class of problems.

STATIC Refers to the storage of data within a MOS circuit without the need for recharging the state of the information. Synonymous with DC. Contrast with dynamic.

SYMBOLIC LANGUAGE A programming language which expresses addresses and operation codes of instructions in symbols convenient to humans rather than in machine language.

TIME SHARING The interleaving in time of two or more independent processes on one functional unit. Pertaining to the interleaved use of time on a computing systm that enables two or more users to execute computer programs concurrently.

USER TERMINAL An input-output unit by which a user communicates with an automatic data processing system.

VOLATILE STORAGE A storage whose content is lost when the power is removed.

WRITE To make a permanent or transient recording of data in a storage device or on a data medium.

ALTAIR 8800 - MITS'S CRAFTILY PROMOTED 8080 BASED COMPUTER SYSTEM.
ASR-33 - THE MOST POPULAR TELETYPE TERMINAL WITH PAPER TAPE I/O INCLUDED.
B URN-IN - PROCESS OF INITIALLY RUNNING COMPONENTS OR SYSTEMS AT EXTREME CONDITIONS TO ELIMINATE THE ONES THAT FAIL QUICKLY.
BYOB - BRING YOUR OWN BOOZE
DEC - DIGITAL EQUIPMENT CORPORATION.
EROM - ERASEABLE READ ONLY MEMORY
FSK - FREQUENCY SHIFT KEYING, A MODULATION TECHNIQUE.
I/O - INPUT/OUTPUT.
IMP-16 - NATIONAL'S 16 BIT MICROPROCESSOR CHIP SET.
KSR-33 - AN ASR-33 WITHOUT PAPER TAPE.
LSI-11 - DIGITAL EQUIPMENT CORP.'S NEW PDP-11 MACHINE BUILT AROUND A CHIP SET JOINTLY DEVELOPED BY WESTERN DIGITAL AND DEC. 16 BIT, 4K MEMORY, KEYBOARD MONITOR BUILT IN, $654-50 OR MORE, $990 EACH.
MARK-8 8008 MICROCOMPUTER DESIGN BY JON TITUS THAT APPEARED AS A CONSTRUCTION ARTICLE IN THE JUNE L974 RADIO-ELECTRONICS MAGAZINE.
MICRO-8 - USER GROUP AND NEWSLETTER NAME.
MIL - MICROSYSTEMS INTERNATIONAL LIMITED, COMPANY NOW OUT OF BUSINESS.
MIKE-2 - 8008 MICROCOMPUTER SYSTEM AVAILABLE FROM MARTIN RESEARCH CO.
MITS - NEW MEXICO BASED COMPANY PRODUCING THE ALTAIR 8800 SYSTEM.
MOD-8 - 8008 SYSTEM DESIGNED BY MICROSYSTEM INTERNATIONAL, BOARDS AVAILABLE FROM SPACE CIRCUITS, 156 ROGER ST, WATERLOO, ONTARIO CANADA.
MOD-80 - THE MOD-8 WITH A COUPLE OF BOARD CHANGES THAT ALLOW IT TO USE THE 8080 PROCESSOR.
MONITOR-8 - THE SUPER KEYBOARD MONITOR AVAILABLE FOR USE WITH THE MOD-8 SYSTEM AND THAT CAN BE MODIFIED FOR USE ON ANY 8008 BASED SYSTEM.
MONITOR-80 - MONITOR-8 MODIFIED FOR USE WITH 8080 PROCESSORS.
MPS - MICRO PROCESSOR SYSTEM, A SET OF BOARDS BY DIGITAL EQUIPMENT CORP. BASED ON THE 8008 MICROPROCESSOR.
NL - ABBREVIATION FOR NEWSLETTER.
PACE - NATIONAL'S SINGLE CHIP 16 BIT PROCESSOR. BASICALLY A ONE PACKAGE IMP-16.
PCC - PEOPLE'S COMPUTER COMPANY.

PDP-8 - THE FIRST AND PROBABLY MOST USED MINICOMPUTER, BUILT BY DEC IN VARIOUS FORMS STARTING IN ABOUT 1961. STILL A VERY POPULAR 12 BIT MACHINE BECAUSE MORE SOFTWARE IS AVAILABLE THAN FOR ANY SYSTEM.

PDP-11 - A 16 BIT MINCOMPGUTER SERIES BUILT BY DIGITAL EQUIPMENT CORP. FEATURING AN EXTREMELY VERSATILE INSTRUCTION SET.

PE - POPULAR ELECTRONICS MAGAZINE.

PROM - PROGRAMMABLE READ ONLY MEMORY

RAM - RANDOM ACCESS MEMORY

RE - RADIO-ELECTRONICS MAGAZINE

RGS-008A - 8008 BASED MICROCOMPUTER SYSTEM PRODUCED BY RGS ELECTRONICS.

ROM - READ ONLY MEMORY

SASE - SELF ADDRESSED, STAMPED ENVELOPE.

SCELBI 8H - 8008 MICROPROCESSOR SYSTEM PRODUCED BY SCELBI.

SCROLLING - ON VIDEO TERMINALS, ALL LINES MOVE UP ONE, TOP LINE IS LOST, BOTTOM LINE CLEARS FOR NEW ENTRY.

SWTP - SOUTHWEST TECHNICAL PRODUCTS CORP.

TGIF - THANK GOODNESS ITS FRIDAY.

TTY - ABBREVIATION FOR TELETYPE WHICH IS A REGISTERED TRADENAME BUT IN SUCH GENERAL USE AS TO MAKE MENTIONING IT SOMEWHAT RIDICULOUS.

TVT - TV TYPEWRITER

TVT-1 - TV TYPEWRITER DESIGNED BY DON LANCASTER USING MOS SHIFT REGISTER MEMORY. ORIGINALLY APPEARED IN RE A COUPLE OF YEARS AGO. VERY POPULAR, THOUSANDS WORKING, A SOMEWHAT OBSOLETE DESIGN TO START NOW.

TVT-2 - TV TYPEWRITER DESIGNED BY A FELLOW IN TEXAS AND BEING SUPPLIED BY SOUTHWEST TECHNICAL PRODUCTS. INTRODUCTORY ARTICLE IN RE, FEB 75 USES TTL LOGIC, 2102 MEMORIES.

TVT-3 - NEW TVT DESIGN BY DON LANCASTER USING ABOUT 18 CMOS IC'S. INFO AND DOCUMENTATION PACKET TO BE AVAILABLE THRU PCC, PROBABLY IN THEIR SEPTEMBER 75 ISSUE.

TVT-4 - NEWEST TVT DESIGN BY DON LANCASTER USING ABOUT 14 CMOS IC'S. MERCHANDISING METHOD NOW BEING WORKED OUT.

UART - UNIVERSAL ASYNCHRONOUS RECEIVER TRANSMITTER, AN LSI CHIP NOW AVAILABLE FOR ABOUT $7 THAT COMPLETELY TAKES CARE OF SERIAL-PARALLEL AND PARALLEL-SERIAL CONVERSIONS.

8008 - THE FIRST POPULAR 8 BIT MICROPROCESSOR CHIP AVAILABLE FROM INTEL. SMALL PACKAGE SIZE REQUIRES DATA MULTIPLEXING WHICH NECESSITATES A LARGE NUMBER OF SUPPORT IC'S. NEW LSI CHIP TO BE AVAILABLE SOON WILL INCLUDE ALL OF THE MULTIPLEXING LOGIC.

8080 - PRESENTLY THE MOST POPULAR 8-BIT MICROPROCESSOR CHIP. PRESENTLY BEING SECOND SOURCED BY AT LEAST 6 COMPANIES AND DESTINED TO BECOME THE PDP-8 OF THE MICROPROCESSORS.

8080-A - INTEL'S NEW 8080 FEATURING FULL TTL DRIVE, JAMMING OF MULTIBYTE INT. INSTRUCTIONS, ETC. UNDOUBTEDLY PRODUCED TO MAKE LIVES OF SECOND SOURCES MORE COMPLICATED. WILL OPERATE IN REGULAR 8080 SOCKET.

MICRO-8 COMPUTER USER GROUP NEWSLETTER
HAL SINGER & JOHN CRAIG -- EDITORS
CABRILLO COMPUTER CENTER
4350 CONSTELLATION ROAD
LOMPOC, CA 93436

AUGUST 3, 1975
VOLUME 1, #9

NO FIELD SEEMS TO CHANGE AS RAPIDLY AS THIS HOBBY COMPUTER THING. SOME BOMBSHELLS ARE ABOUT TO HIT THE HOBBY MARKET. LOOK FOR:

1) BILL GODBOUT'S COMPANY WILL ANNOUNCE TWO KITS ON SEPTEMBER 1:

A) A PACE 16 BIT SYSTEM WITH 1 OR 2 K OF MEMORY AND A COMPLETE LINE OF PERIPHERALS WITH A VERY LOW TARGET PRICE. A DETAILED INFORMATION PACKAGE IS BEING PREPARED AND WILL BE AVAILABLE SOON FOR A VERY LOW PRICE AND SHOULD BE VERY INFORMATIVE. (THE PACE IS ABOUT 90% LIKE A DATA GENERAL NOVA AND THERE ARE SOME THAT HAVE HOPES THAT NOVA SOFTWARE CAN BE MODIFIED TO BE USEABLE BUT THAT MAY BE A LITTLE OPTIMISTIC.)

B) AN MSI-11 KIT FOR UNDER $1000. THIS IS A MICROPROGRAMMED CPU USING TTL LOGIC WHICH EMULATES THE FULL PDP-11/40 INSTRUCTION SET.

BILL IS RELUCTANT TO DO MUCH ADVERTISING OR PASS OUT INFORMATION UNTIL THEY ARE READY TO DELIVER IN VOLUME TO TRY TO AVOID PROBLEMS THAT HAVE PLAGUED EVERY OTHER KIT COMPUTER OFFERING SO FAR BUT EVERY INDICATION IS THAT WHEN THEY ARE READY TO GO, YOU WILL BE ABLE TO OBTAIN TREMENDOUS SYSTEMS FOR AN AFFORDABLE PRICE.

2) JOHN BURGOON OF SOLID STATE MUSIC IS FIRMING UP PLANS FOR A "SUPER 8080 SYSTEM" WITH A BETTER DESIGN AND LOWER COST THAN ANYTHING SEEN YET. THIS IS A VERY EARLY LEAK SO DON'T BE UPSET IF INFORMATION IS UNAVAILABLE FOR ANOTHER MONTH OR SO.

3) EVERYONE HAS HIGH HOPES FOR THE M6800 SYSTEM ANNOUNCED BY SPHERE. THEIR ADVERTISING LITERATURE INDICATES THAT THEY DO REALIZE THE PROBLEMS OF STARTING OUT A LOW BUDGET OPERATION BUT THEY SEEM TO INTEND TO DO EVERYTHING POSSIBLE TO DELIVER HARDWARE AND SOFTWARE AS SPECIFIED ON TIME. THEIR INTRODUCTORY PRICES ARE SUPERB BUT MAKE SURE YOU USE MASTERCHARGE. DON'T GAMBLE THAT KIND OF MONEY ON GOOD ADVERTISING LITERATURE.

4) PROCESSOR TECHNOLOGY IS DELIVERING THEIR ADVERTISED ITEMS "OFF THE SHELF" WITH NOTHING BUT RAVE REPORTS. THEY ARE OFFERING 8080 SOFTWARE FOR LESS THAT COPYING COST. SOON SOFTWARE WILL BE AVAILABLE ON MASK PROGRAMMED ROMS VERY CHEAP. THEY ARE WORKING ON LOW COST CASSETTE AND DISK SYSTEMS AND OTHER ALTAIR PERIPHERALS AS FAST AS THEY POSSIBLY CAN.

5) MOS TECHNOLOGY REPORTEDLY ANNOUNCED PIN COMPATIBLE NEARLY IDENTICAL M6800 CPU CHIPS FOR $20 IN QUANTITIES OF ONE! (SEE ELECTRONICS, END OF JULY ISSUE.) IT ISN'T TOTALLY CLEAR HOW IDENTICAL THEY REALLY ARE BUT THAT MEANS THAT OTHER MANUFACTURERS WILL PROBABLY BE SHOOTING FOR THAT PRICE LEVEL WHICH MEANS WE CAN EXPECT TO SEE $24.95 8080'S, $15.95 8008'S & PACE, F8, AND OTHER CPU'S FOR ABOUT THE SAME PRICE. I'VE HEARD FROM SEVERAL SOURCES THAT THE EXPECTED PRICE OF AN M6800 IN A YEAR WILL BE ABOUT $10. IT SEEMS NOW THAT THE MOST IMPORTANT PRIORITY IS TO LINE UP SUPPLIERS FOR THE SUPPORT CHIPS NECESSARY TO IMPLEMENT 5-6 CHIP CPU SYSTEMS.

6) BASIC'S KEEP SHOWING UP. MITS HAS DELIVERED AT LEAST ONE COPY OF 4K BASIC (NO REPORT YET ON HOW WELL IT RUNS) AND THEIR 8K BASIC IS RUNNING WELL ON THE 8080. PROCESSOR TECHNOLOGY WILL SOON RELEASE LISTINGS OF AN 8080 BASIC AND WILL PROBABLY SUPPLY IT IN ROM. ANOTHER 8080 BASIC I S RUNNING BUT NO INFORMATION CAN BE RELEASED ON IT. THE DIGITAL GROUP IS STELL TALKING ABOUT 8008 & 8080 BASICS BUT NOTHING IS AVAILABLE YET. THE MOST IMPORTANT PIECE OF SOFTWARE REIGHT NOW FOR MANY OF US IS AN 8008 BASIC. THERE ARE A LOT OF 8008 MACHINES AROUND AND THOSE OF US WITH THEM D ON'T REALLY WANT TO BE LEFT OUT OF THE ACTION.

7) A NEW COMPANY IS STARTING THAT HOPES TO HAVE 8008/8080 VERSIONS OF FOCAL FOR ALL OF YOU FOCAL FREAKS THAT DID YOUR WORK ON DEC MACHINES.

8) FOR THE ALTAIR OWNERS, WOULD YOU BELIEVE AN 8K MEMORY MODULE FOR UNDER $200! I WANT TO DO SOME MORE CHECKING BEFORE I MENTION WHO HAS IT AND WHEN IT WILL BE AVAILABLE.

ALSO FOR ALTAIR OWNERS, JOHN BURGOON OF SOLID STATE MUSIC HAS SOME REALLY BEAUTIFUL BOARDS AVAILABLE FOR I/O CONSTRUCTION. CONTACT HIM A T 1222 CAROLYN DRIVE, SANTA CLARA, CA 95050 296-7330. MARK-8 OWNERS, D ON'T FORGET HIS 4K 2102 BOARD PLAIN OR STUFFED. REPORTS ARE THAT THE QUALITY IS SUPERB.

9) RUMORS FLOATING AROUND INDICATE THAT BYTE HAS ALREADY RECEIVED OVER 20,000 SUBSCRIPTIONS AND ADVERTISING RATES ARE UP TO $1500 A PAGE. THE F IRST ISSUE IS BACK FROM THE PRINTER AND WILL HAVE ABOUT 94 PAGES WITH MORE ADVERTISING THAN ANYTHING ELSE BUT LET'S REALLY SUPPORT THEM. IF IT TURNS OUT AS GOOD AS "73" MAGAZINE IT SHOULD BE AN INVALUABLE AID TO THE HOBBY EFFORT.

10) CURRENT RUMORS INDICATE THAT ONE CAN EXPECT DUAL FLOPPY DISK DRIVE U NITS SOON FOR UNDER $1000. LET'S HOPE IT'S REAL SOON.

11) EVEN MARTIN REASEARCH HAS HAD TROUBLE DELIVERING ALTHOUGH THINGS ARE COMING THRU NOW. IT WAS FRUSTRATING TO RECEIVE THE UNIT WITHOUT EVEN A PIECE OF PAPER TELLING WHICH KEYS ARE WHICH. DOCUMENTATION IS ARRIVING NOW AND THEY PROMISE MUCH MORE DETAILED DOCUMENTATION SOON. MANUALS, 4K M EMORY BOARDS, EXTRA 2112 MEMORY CHIPS, AND I/O BOARDS ARE STILL BACK-O RDERED. IT IS A NEAT LITTLE MACHINE, ALL UNITS ARE BEING SUPPLIED AS-S EMBLED AND TESTED TEMPORARILY (RICHARD LERSETH WAS EXTREMELY UNHAPPY TO RECEIVE HIS ASSEMBLED. HE WAS REALLY LOOKING FORWARD TO SOLDERING.), THE KEYBOARD MONITOR SUPPLIED WITH IT READS A CALCULATOR KEYBOARD SO YOU CAN LOAD AND RUN PROGRAMS WITHOUT ANY PERIPHERALS, AND ITS STILL THE LOWEST COST FACTORY PREPARED KIT AVAILABLE. IT WILL SURE BE NICE TO GET THE FULL DOCUMENTATION PACKAGE THOUGH.

12) SCELBI CONTINUES TO ADD TO THEIR LEGION OF SATISFIED OWNERS. THEIR MACHINE MAY NOT BE THE CHEAPEST OR THE PRETTIEST BUT IT IS EASY TO ASSEMBLE, DOES EXACTLY WHAT IT IS SUPPOSE TO, DELIVERY IS ON TIME, AND SUPPORT IS SUPERB. THEIR PROGRAMMING MANUALS CONTINUE TO EARN ABSOLUTE-LY RAVE REVUES!!

13) ROBERT SWARTZ HAS DELIVERED OVER 45 OF THE MIL MOD-8 DOCUMENTATION PACKAGES MENTIONED IN NL #7. HE HAS HIS OWN MACHINE MODIFIED FOR AN 8080 AND IS RUNNING MONITOR-80 ON IT. HE WILL SOON HAVE A FULL DOCUMENTATION PACKAGE PUT TOGETHER FOR THESE 8080 MODIFICATIONS.

THIS IS THE NINTH ISSUE OF VOLUME 1 WHICH WILL CONCLUDE WITH #12. WE WILL THEN BE FACED WITH ANOTHER DECISION AS TO WHAT TO DO NEXT. IT IS QUITE POSSIBLE THAT A NEWSLETTER TYPE PUBLICATION WILL NO LONGER BE NECESSARY WITH ALL OF THE COMMERCIAL VENTURES THAT ARE NOW OPERATING. BUT, ONE CAN ARGUE THAT A STRICTLY NON-BUSINESS TYPE PUBLICATIONS IS NECESSARY TO PROVIDE A FORUM FOR HOBBYISTS THAT NEED TO THROW ROCKS AT COMMERCIAL TYPE BUSINESS VENTURES.

WE WOULD LIKE YOUR ADVICE. PLEASE WRITE AND LET US KNOW WHAT YOU WANT TO SEE HAPPEN IN THE FUTURE.

IN NL'S 10, 11, & 12 YOU CAN EXPECT TO SEE A COMPLETE ROSTER OF ALL PEOPLE THAT HAVE CONTACTED US (ABOUT 1200+) ARRANGED IN BOTH ALPHA-BETICAL AND ZIP CODE ORDER. IF YOU DO NOT WANT YOUR NAME AND ADDRESS TO APPEAR, PLEASE SEND US A POSTCARD SO STATING IMMEDIATELY. IF ALL YOU ARE WORRIED ABOUT IS RECEIVING SOME JUNK MAIL, PLEASE REMEMBER THAT THEY STILL MAKE GARBAGE CANS AND THE BENEFITS OF GETTING TOGETHER WITH OTHER FELLOW HOBBYISTS FAR OUTWEIGH THE CONVENIENCE OF A LITTLE JUNK

I'M AFRAID THAT TELEPHONE CALLS TO CABRILLO HIGH SCHOOL REGARDING USER GROUP ACTIVITIES HAVE COMPLETELY SWAMPED OUT THE SECRETARIES TIME. I'M USUALLY UNAVAILABLE DURING THE SUMMER AND DURING THE SCHOOL YEAR I AM IN CLASS FROM 8:00 UNTIL 2:30 AND CANNOT BE REACHED. I REALIZE THAT IT IS MUCH MORE CONVENIENT TO DO BUSINESS BY PHONE (OH, WHAT I WOULDN'T DO FOR A WATS LINE) BUT I MUST ASK THAT PARTICIPANTS LIMIT CALLS TO THE SCHOOL TO URGENT ONES ONLY. MY HOME PHONE (805-735-1596) WILL ONLY BE ANSWERED BY ME AND YOU ARE WELCOME TO CALL EARLY OR LATE. I MAY IMPLEMENT A RECORDED MESSAGE UNIT SO HANG UP WITHIN A MINUTE IF YOU GET THE RECORDED MESSAGE SO YOU WILL NOT BE CHARGED FOR THE CALL. JOHN CRAIG WILL SOON BE WORKING IN TOWN AND WILL HAVE A PHONE AT WHICH HE CAN BE REACHED DURING THE DAY. THANKS.

Theodore E.P. Sallume

Theodore E. P. Sallume
945 Via Fargo
Santa Maria, CA., 93454
A.C. 805-937-4541

Dear Hal
You often talk about how we must "write-off" the money we send off to a supplier. Diamond merchants have found a way to solve this problem. They send the goods on consignment to the the buyers bank and for a fee the bank holds the goods until it receives payment. While this method is not practical for us, Master Charge has many of the same features including the cost.

A dealer can know in 10 minutes if your MC is good, this compares with 10 days for a check, however it will cost him 3%. Besides faster service, MC provides safty for your money as most banks when asked will back charge all payments for the goods not received. Check with your bank in advance. BankAmericard would not give me that assurance over the phone. I have used this method on MC.

IMPORTANT NOTICE TO CUSTOMERS

New Legislation for Your Protection

The Song-Beverly Credit Card Act of 1971 (section 1747.90 of the California Civil Code) provides in part that the Bank's right to recover any credit extended to you for a purchase from a retailer through use of your MASTER CHARGE Card is subject to any defenses you may have as a buyer against the retailer as to such purchase, IF ALL OF THE FOLLOWING OCCUR:

(1) The purchase price of the item as to which you assert a defense exceeds fifty dollars ($50.00);

(2) The purchase was made in California;

(3) You have made a written demand on the retailer with respect to the purchase and have attempted in good faith to obtain reasonable satisfaction from him; and

(4) You give written notice to the Bank, naming the retailer and specifying the date of the purchase, the goods or services purchased and their cost, the nature of your defense (i.e., why you are dissatisfied) and any steps you have taken in attempting to obtain satisfaction and resolve the dispute.

If your defense is a valid one, following these procedures means that you may be relieved of part or all of your repayment obligation to the Bank as to the disputed purchase.

MASTER CHARGE Billing Errors

The new law also provides that if we, the card issuer, should make a billing error on your MASTER CHARGE account, we must correct it no later than 60 days from the date you mail to us written notice of the error. In the event of any such error, please provide full details of the problem in writing to the address noted on your regular MASTER CHARGE statement, or to Wells Fargo Bank, N.A., Credit Card Department, P. O. Box 44081, San Francisco, California 94144.

SINCE 1852 WELLS FARGO BANK, N.A.

MC 1008 (3-72)

P. S. Wells Fargo has indicated to me that there are similar federal laws which also apply and that the bank which carries the merchant's Master Charge is responsible if the merchant goes under. The only requirement for becoming a Master Charge merchant is to be on good terms with your bank. They think 3% is a lot for cashing a check so you might want to be a MC merchant your self if you start selling surplus and deal only with merchants who honer MC. Remember the costs. TEPS

Stephen L. Diamond
311 Carl Street
San Francisco, CA 94117

June 22, 1975

Dear Hal:

Several months ago, I sent you a package containing the self-addressed, stamped envelopes sent to me by individuals interested in the Mark-8 user's group, details on my M6800 microcomputer development project, a long letter, and $5.00 to cover your costs in sending me future newsletters. I also sent tentative suggestions on an 8080/M6800 processor link, and mentioned some tentative plans for software to be implemented on the M6800 and a potential PDP-8 and PDP-15 style FORTRAN cross-assembler for the M6800 family. I'm sorry you didn't receive it.

Since then, I've started design and coding on a multi-programming real-time operating system for the M6800, with multiple software priority levels, deferred scheduling, and supporting multiple peripherals such as cassette, TTY, and punched tape to begin with. I'm planning on adding an A/D and D/A interface with possible DMA for high sampling rates. If you're not too familiar with the MC6800 CPU, let me mention a few features. The MC6800 is an 8-bit machine, with an architecture and instruction set very very similar to that of a PDP-11. With a 1 microsecond cycle time, most instructions take 2 or 3 microseconds to complete, although some register functions can be completed in 1 cycle. It supports vectored interrupts, and has a mask instruction as well as a non-maskable interrupt input for high priority access. It can be run in a single-instruction mode for console debugging, and all peripherals and memory interface with the CPU on a single 8-bit bidirectional data-buss, just like a Unibus. The memory address buss is 16-bits wide for 64K address space for memory and peripherals. Motorola offers an evaluation kit, consisting of the Programming and Applications manuals ($50 worth), the MC6800 CPU, two 128 x 8 RAMS, two 16-bit parallel I/O interfaces, one serial port, and a ROM containing loading, I/O, and debugging firmware, all for $300.00. With the addition of some TTY drivers and a single +5 supply, the system is runnable using the sort of-DDT like firmware ROM to examine and load memory locations, load papertape programs, print registers, control interrupts, and so forth! Truly a third-generation microprocessor, and the CPU costs about the same as the 8080, at least from the prices I've seen in 73 Magazine. Also, AMI (I think) is an authorized second source, and offering chips made from the same masks at lower cost.

We're planning to make available a ROM containing the real-time operating system, including centralized, device-independent I/O and more flexible debug facilities as soon as I've completed the software. With the low-cost vendor-programmed ROMs available, such a operating system would facilitate much M6800 development, I feel.

Well, Hal, that about wraps up my microcomputer activities for now. As I mentioned in my last letter, I have one unopened Mark-8 pc board set and a TV Typewriter (earlier version) for sale, and offers are solicited. I'll keep you informed on the real-time system for the M6800, and send a schematic of the hardware configuration when we've laid out the pc boards (I'll send a layout too). Please keep me informed on 8008 and 8080 developments; I'll try to answer anyone's questions on M6800 family hardware and software.

Sincerely,

Steve Diamond

Stephen L. Diamond

Dear Hal,

Hope the enclosed is sufficient information on the Stampit-Etchit kit for the next newsletter. From the time I received my package from the Digital Group to when I had the the cassette interface board made and all parts plugged and soldered was only two hours. The Stampit-Etchit kit sure beats blindly drilling holes and then point to point wiring! I forgot to mention that M-Tech will take phone orders for both Mastercharge or Bank Americard.

I still haven't received my Suding TV typewriter unit eventhough I sent them a check over two months ago and received a card that it would be shipped on 1 June. I sure hope they haven't given up the ghost before even publishing one Newsletter. Keep up the good work. The Micro 8 Newsletter seems to be the only continuing source of information.

Sincerely,

Lee S. Mairs

Stampit-Etchit Kit

For all of you without the elaborate camera equipment necessary to copy the printed circuit art layouts accompanying the various Mark 8 changes and enhancements, M-Tech Engineering, Inc., Box C, Springfield, Virginia 22151, has developed an elaborate set of rubber stamps for designing and fabrication of prototype printed circuit boards. The basic SE-2 kit contains eight stamps for the most commonly encountered components, resist ink, stamp pad, resist pen, and even a plastic bag to hold the board while etching. A few hints for successful board production may be in order. First, tender loving care in stamping the component stamps results in sharp edge definition. Too much pressure may blot the ink. Secondly, read the instructions included with the kit! There are many fine hints noted, such as going over connecting lines with the resist pen twice to prevent etch through. Lastly, watch the board while it is being etched. As soon as the unwanted copper has been removed, take the board out of the etchant bath. The concentration of the various etching materials varys even among manufactures. For example, two bottles of Ferric Chloride obtained from Radio Shack varied by three minutes (ten minutes for the first board and thirteen minutes for the second) in the time necessary to etch identical boards for the Suding cassette interface.

M-Tech Engineering, Inc. is owned by two guys who have also become Mark 8 devotees. While trying to obtain components for their own installations they ran across some 256X1 UA3656D RAMS that are pin for pin equivalents to the 1101 RAMS called for in the original Mark 8 construction. They have a limited supply that they will sell for $1.30 each. If you want a full boards worth (1K of memory), you can get 32 devices for $38.40.

Although M-Tech is primarily noted for its VHF power amplifiers, they are taking a long hard look at the computer hobbyist market, specifically peripherals for the Altair and the Mark 8 units.

MAKE
PROFESSIONAL LOOKING
P.C. BOARDS FAST
AND EASY

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- FANTASTIC

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ETCH-IT

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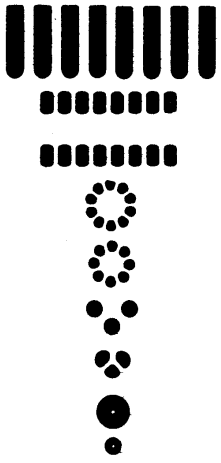
Simple as A.B.C.

A. Stamp Components on P.C. Board. **B.** Use Pen to Interconnect Lines. **C.** Etch Board.

SE-2 KIT CONTAINS:



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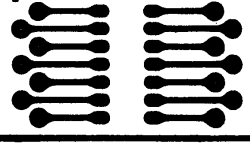
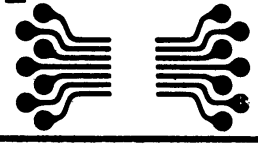
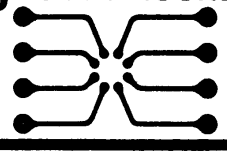


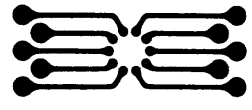
#2 FLAT PACK



#3 8-PIN ROUND



#4 10-PIN ROUND



M-TECH ENGINEERING
BOX C
SPRINGFIELD, VIRGINIA 22151
703/354-0573

WILLIAM E. SEVERANCE, JR.

TELEPHONE
207 925-2271

MAIN STREET
CENTER LOVELL, MAINE 04016

July 12, 1975

Dear Hal or John,

I've enjoyed the last two newsletters greatly but am sorry that I won't be able to contribute much material while my real estate business is keeping me busy day and night this summer.

In regards to my Octal Keyboard Loader circuit printed in NL #7, I've sent out 37 copies of the PC board layouts. If any one else should want one, please send a full size SASE with 20¢ postage. With 6 Xerox sheets in each, plus the extra postage I've had to put on, I've spent about $14 sending them out. Oh well, I'm highly pleased with the response. Two corrections in the circuit printed in the NL should be mentioned. 1) Eliminate the 50 mfd capacitor from KP to ground. 2) Change the .001 mfd capacitor from KP to the set pin of the 7474 to 100 pf. I've found the loader to make entering data and addresses by hand both easy and rapid.

While a leg injury kept me from showing property for a few days, I finally completed the Digital Group's modifications to the front panel controls and am pleased with them. I highly recommend against the use of 7-segment octal displays for address or memory data readout as it obscures the interpretation of bit patterns somewhat. Finally, I've also completed my I/O port expansion, 8k of pluggable 2102 RAM boards, AC power switching, and have stuffed everything into an attractive cabinet. Sure beats wires hanging over everything! Enclosed is a brief description of my I/O expansion and patch panel which I find very convenient. If any one wants more information, I'll write it up, but would now rather spend my time developing software -- something I couldn't do until my hardware was completed.

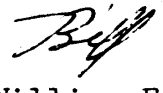
After months (or so it seems), Mini Micro Mart finally shipped my Suding Calculator Interface kit sans any promised software. Other ordered items have not yet appeared much to my rising anger with them as a supplier. As far as the Calculator Interface goes, the PC board had all the IC pin holes drilled too small (no real problem to redrill, however), was not plated through (would have been nice to allow the use of sockets), and several resistors were missing while several others were present in an excess number. Construction was not difficult even with the minimal diagrams supplied. With the information supplied in the Digital Group's preliminary write up, I have been able to write service routines for the calculator but would sure like to have seen Dr. Suding's software, particularly in regards to how he intends to store numbers in memory. Although transfers between computer and calculator are very slow and cumbersome, the interface seems worth the price and

while providing a floating point package also provides for all the common transcendental functions and then some. Being a great advocate of reverse polish notation, especially when writing an expression evaluator, I now wish I had opted to purchase the alternative calculator IC for RPN. I'm working now on a program to calculate and print out loan amortization tables but don't know when I'll get it finished.

Final topic -- have you seen the brochure put out by Sphere Corp. concerning their Motorola MC6800 based computer system? Having been quite impressed and perhaps a bit sceptical of the "how can they offer so much for the price" problem, I gave Sphere's president Michael Wise a call. He seemed very willing to answer my questions, was honest in his comparison of the MC6800 CPU with the LSI-11, and did not try to push me to purchase until I was convinced that the Sphere I system was what it was meant to be. Their extended BASIC looks good and, I believe, is ready now as is their disk operating system. Presently, I am looking for a larger system with disk and line printer to use in my real estate business for mailing lists, cross matching of prospects and listings, data storage, etc. The LSI-11 appears to be the most advanced processor in my price range in respect to its instruction set, general purpose accumulators, and many addressing modes. However, I'm afraid that it will be difficult to get a system running around it, especially with my limited knowledge of hardware and the cost will no doubt run quite high. Perhaps someone will develop a complete package around it, but when? Right now, the Sphere System 4 with CPU, 20k memory, keyboard and CRT display, cassette interface, built in TV monitor, 110 cps line printer, 2 (not one) IBM floppy disks, extended BASIC, a DOS, ROM for console control, editor, assembler, and what ever else I've forgotten for $5453 in kit form looks beautiful, if everything is as offered. For this, I think I'd be willing to settle for the slightly less capabilities of the MC6800 chip in regards to addressing and accumulators. If anyone has any thoughts or information on Sphere, please write or call me!!!!

Out of time for now -- I'll try to really hit the software in the coming weeks and get some camera ready copy to you for future NL's.

Sincerely,



William E. Severance, Jr.

P. S. In giving my address, note that the abbreviation for Maine is ME not MN (that's Minnesota). Every request for the Keyboard Loader circuit was addressed wrong. Thank God and the P. O. for zip codes!

WILLIAM E. SEVERANCE, JR.

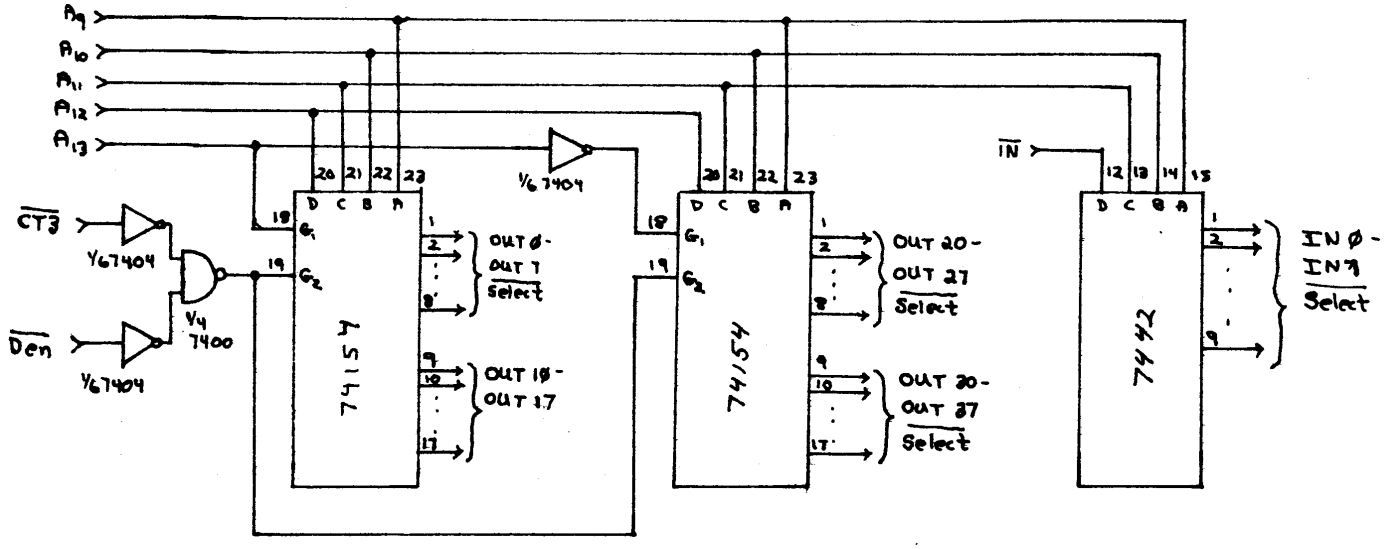
TELEPHONE
207 925-2271

MAIN STREET
CENTER LOVELL, MAINE 04016

MARK 8 I/O EXPANSION

The following is a brief description of the modifications I've made to my Mark 8 to provide full decoding of the device codes and convenient connection of peripheral devices.

I. The following circuit decodes the 01 RRM MM1 input and output instructions to provide 8 input, 24 regular output and 8 special output ports which transfer data from the accumulator to an output device on state t3 of an IN0-IN7 instruction.



Note: $\overline{CT3} = \overline{T3} + (\overline{Sync} \cdot \phi_2) = \overline{T3 \cdot (\overline{Sync}\,\phi_2)}$

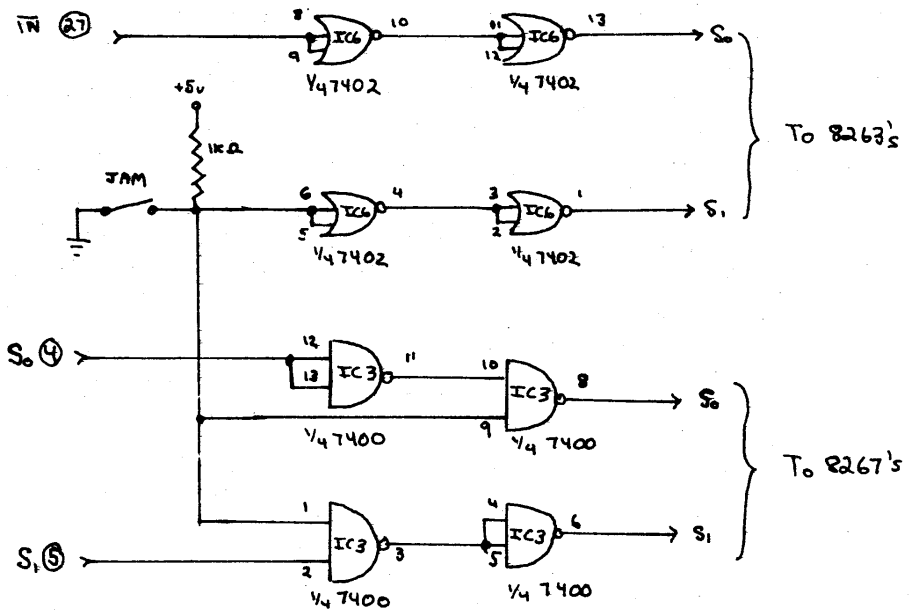
This is easily derived on the CPU board by NAND ing the outputs of IC17 (pin 3) and IC19 (pin 8).

The idea of using IN0-IN7 to also do output should be credited to MP Publishing Co. ECS-5 presentation.

II. Now that we have the port select lines (all active low, by the way) what is the best way to present them to the outside world? For convenience when it comes to changing device assignments and quickly connecting new devices, I've built the following patch board with 40-16 pin DIP IC sockets, 16-DM8095 tri state AND gates, 2-7404 inverters, and 8- 7437 Quad 2-input NAND Buffers, and what seemed like several miles of wire. A PC board would have been nice, but expensive to produce. The IC sockets can be easily attached to 0.1" perfboard with hot melt glue.

Finally, if you're with me so far, modifications should be made to the Mark 8 input MUX board as follows:

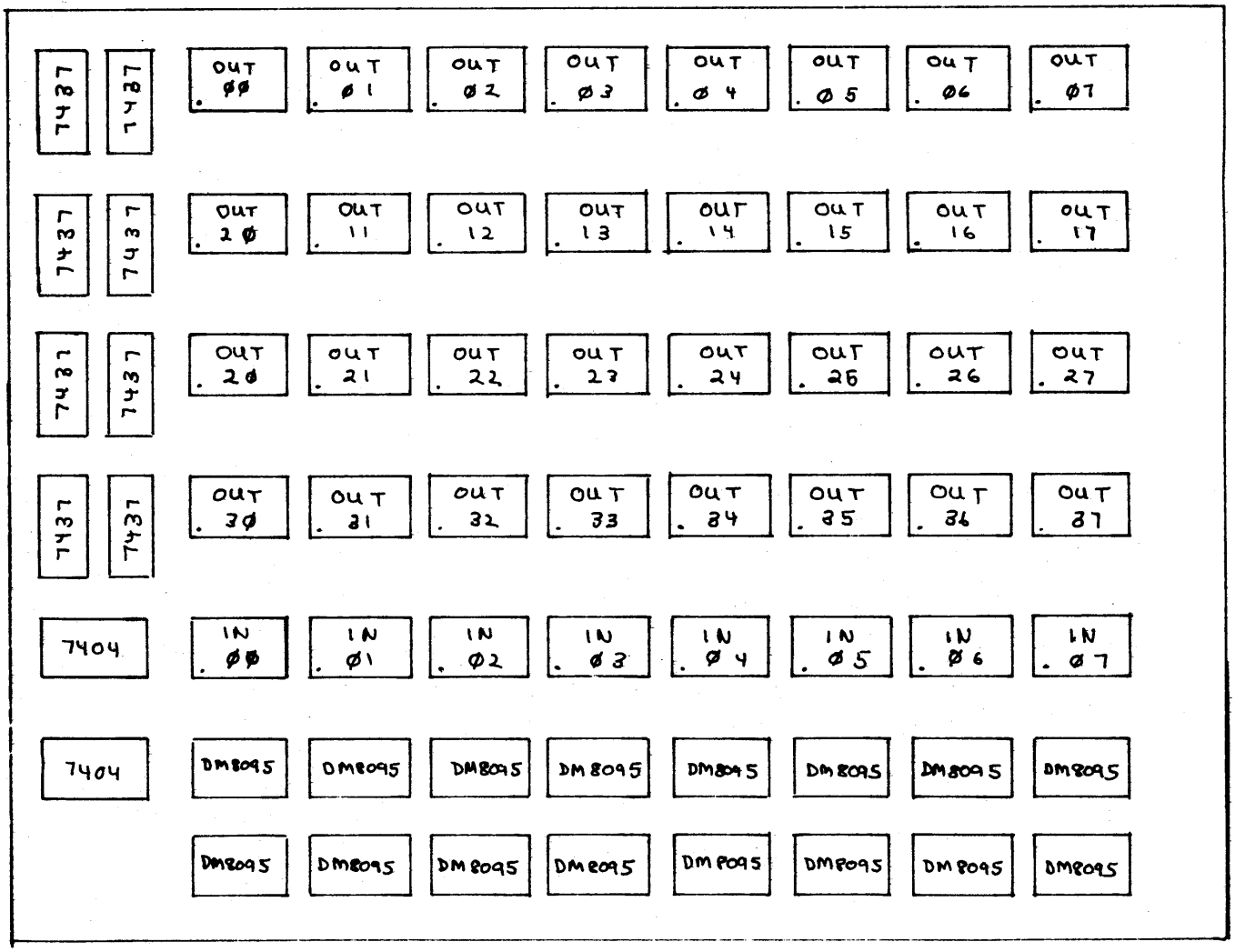
1) Remove the old 7442 decoder
2) Rewire the existing 7400 and 7402 gates as follows:



These changes will allow all input instructions IN0-IN7 to select former Mark 8 input port 0. Former Mark 8 input port 1 will be selected when the JAM switch is closed, thus allowing the permanent connection of my octal keyboard loader to this port. The interrupt instruction switches remain as is, selected only under CPU control.

Thus, ends this brief (???) description. Write or call for further information or answers to questions.

I/O Patch Panel for the Mark 8



WILLIAM E. SEVERANCE, JR.

TELEPHONE
207 925-2271

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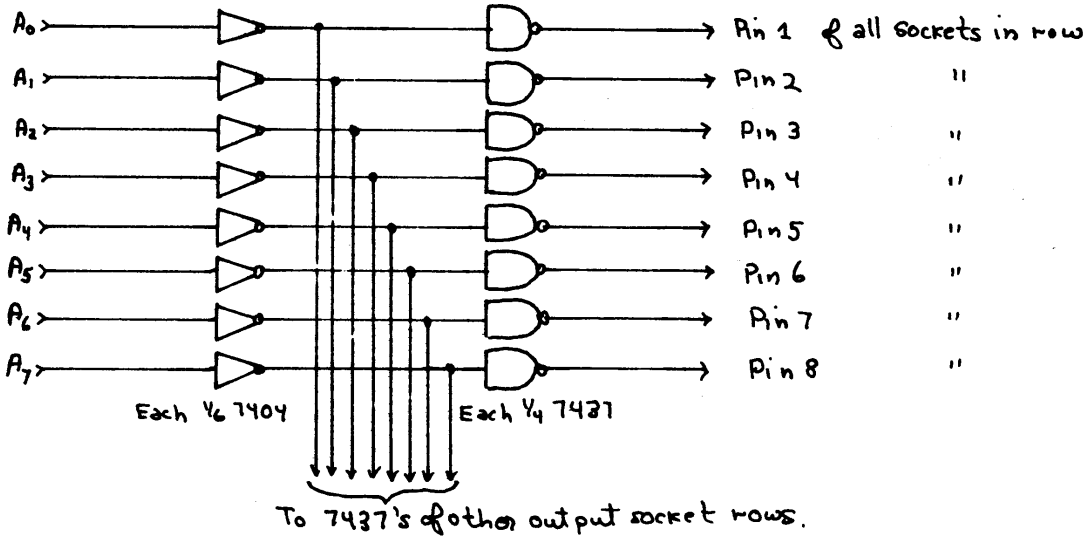
Oh yes, I forgot to mention that connections to the I/O patch panel are made with 16 pin dip plugs (James Electronics has nice ones) attached to 16 conductor ribbon cable. I've used up to 6' runs to the TVT and Calculator interface with no drive problems.

Each output port socket has the following pin designations:

1-Data Bus Out 0	16-Ground
2-Data Bus Out 1	15- +5volts
3-Data Bus Out 2	14- -12volts
4-Data Bus Out 3	13- +12volts
5-Data Bus Out 4	12-Output Port Select Strobe (from above decoder)
6-Data Bus Out 5	11-Interrupt Request (Channel 0-7)
7-Data Bus Out 6	10-
8-Data Bus Out 7	9-

Each row of output port sockets is buffered by the 7437 NAND gates as follows:



Each input port socket has the following pin designations:

1-Data in 0	16-Ground
2-Data in 1	15- +5volts
3-Data in 2	14- -12volts
4-Data in 3	13- +12volts
5-Data in 4	12-Input Port Select Strobe (from above decoder)
6-Data in 5	11-Interrupt Request (Channel 0-7)
7-Data in 6	10-
8-Data in 7	9-

WILLIAM E. SEVERANCE, JR.

TELEPHONE
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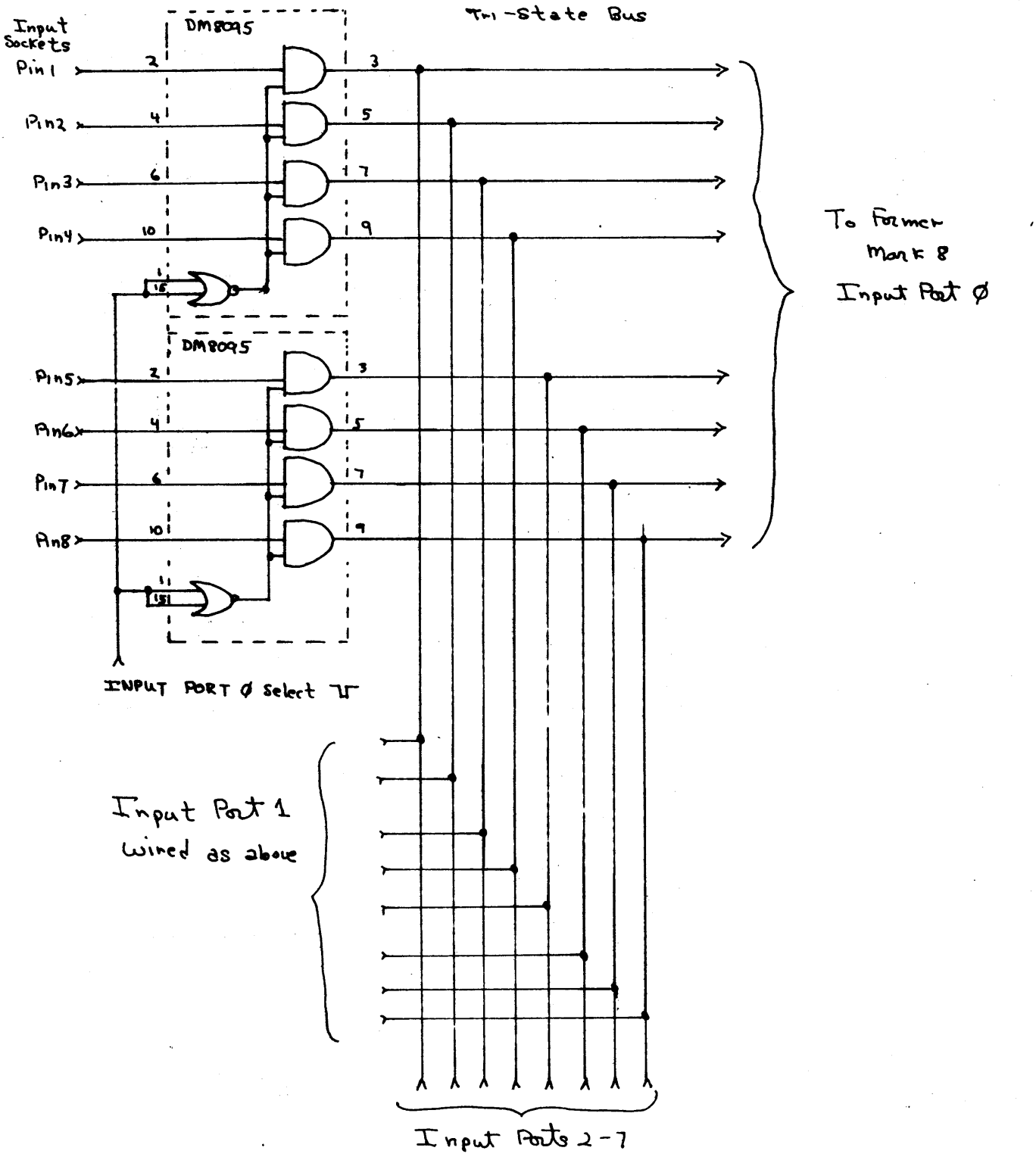
The input ports are wired using the DM8095's as follows:



Pa

MICHAEL CHRISTOFFER

4139 12th NE
NO. 400

SEATTLE, WASH. 98105

Dear Mr. Singer,

As many in the microcomputer community know, a good number of µc/software oriented publications exist in the public domain. During the course of my library search a listing of some documents has been compiled. I would like to share this listing with others in the community. Please publish this list if it seems of significance.

A warning about these documents must be stated. The National Technical Information Service (NTIS) makes these publications available in a printed or microfiche format. Abstracts must be reviewed for each of these publications before being ordered. A number of the publications have been inspected at a major University and found to be merely nothing more than summary reports for projects, ie-lacking in great hardware or software substantive content.

Some of the documents are quite good; however, considering the wide interest range of individuals in the µc community, none will be recommended. Most of the publications are from AEC & NASA but available from NTIS. NTIS ordering information is available with the abstracts when reviewed.

The intent of this submission is to give interested individuals a start in the search for information in their interest available in the public domain. This list is by no means complete. If others in the community locate references to other public domain documents, these can be submitted directly to me. A list will be compiled and made available to µC readers v.i.a. Micro-8 group newletter or others.

Respectfully,

Michael Christoffer

REPORT #	TITLE
UCID-16281	ADAPTING A MINICOMPUTER PROGRAMMING SYSTEM TO THE INTEL MCS-4 and MCS-8 MICROCOMPUTER SYSTEMS. Peterson, R.L. (California Univ., Livermore Lawrence Radiation Lab). July, 1972.
UCID-16351	SIMULATOR PROGRAM FOR THE INTEL MCS-8008 CPU. Magnuson, W. Jr. (California Univ., Livermore. Lawrence Radiation Lab.) March, 1973.
UCID-16341	STORES STOCK MICROCOMPUTER SYSTEM: THE MCS-8, 8-bit PROCESSOR CONTROLLER. Fisher, E; Spann,J; Olken, H.; Goodman,r.; et-al (California Univ. Livermore, Lawrence Radiation Lab) July, 1973

AD-765680 A HELICOPTER FLIGHT PERFORMANCE SYSTEM USING AN LSI MICROPROCESSOR. Eloe, E.E. (Naval Postgraduate School, Monterey, Calif.) June, 1973

AD-771382 MICROPROCESSOR DEVELOPMENTS FOR PROJECT 2175. Keele, R.V., et-al (Naval Electronics Lab Center, San Diego, Calif.) Aug., 1973.

UCID-16350 PL/M: A HIGH LEVEL LANGUAGE FOR THE INTEL Mcs-8 , 8008 CPU. Magnuson, W.G., Jr., et-al, (California Univ; Livermore, Lawrence Radiation Lab) August, 1973.

BNWL-1795 MICROPROCESSOR SAMPLED DATA PROCESS CONTROLLER. Seim, T.A. (Battele Pacific Northwest Labs, Richland, Wash.) November, 1973.

UCID-16507 OCTAL DEBUGGING PROGRAM (ODT) FOR THE MCS-8 COMPUTER. Fisher, E. et-al. (California Univ., Livermore Lawrence Radiation Lab.) November, 1973.

PB-197995 AN INTRODUCTION TO THE DIRECT EMULTATION OF CONTROL STRUCTURES BY A PARALLEL MICROCOMPUTER. Lesser, V.R. (Stanford Univ., Stanfor, Calif.) Jan., 1 71.

PB-235 874/5GI A BASIC LANGUAGE INTERPRETER FOR THE INTEL 8008 Microprocessor. Weaver, A.C. et-al (Illinois Univ., Urbana. Dept. of Computer Science) June, 1974.

also UIUCDS-R-74-658

PB-235-773/9GA A TEXT EDITOR DESIGN. Kai, J.M. (Illinois Univ, Urbana, Dept of Computer Science.) July, 1974.

CAPE-2367 THE MCS-8 CONTROL PROCESSOR, May, 1973.

DP-135 DESK-TOP MICROCOMPUTER (8008Design). Byrd, J.S. (DuPont de Nemours, E. I. and Co.) August, 1974.

AD-786 598 MICROCOMPUTER CONTROL OF INDUSTRIAL PROCESS. Hearn, D.W. et-al (Florida Univ. Gainesville Dept of Industrial and Sys etc.) August, 1974.

AD-783 868 DESIGN STUDY OF AN AVIONICS NAVIGATION MICRO COMPUTER. McCracken, W.L. (Naval Postgraduate School, Monterey, Calif.) June, 1974

AD-782 844 PORTABLE VAPOR SURVEILLANCE SYSTEM. Arnold, J.T. et-al (Varian Associates, Palo Alto, Calif.) June, 1974.

AD/A-006 119/2GA USE OF A UP IN A SUPERVISORY CONTROL APPLICATION December, 1974. (John Hopkins University).

NTIS/PS-75/251/9GA MICROCOMPUTERS: A BIBLIOGRAPHY WITH ABSTRACTS. (NTIS) Jan., 1975

AD-784 881/5gI CHESS GAME PROBLEM SOLVING: THE DEVELOPMENT OF A TACTICS ANALYZER. November, 1974.

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GEORGE FISCHER
72 SOUTH RAILROAD AVENUE
STATEN ISLAND, N.Y.
10305

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Volume 1

DON H. MORRISON, 32200 ARLINGTON, BIRMINGHAM, MICH. 48009, 313-642-0175

SOME PROS AND CONS ON MITS AND THE ALTAIR 8800 COMPUTER

I RECEIVED MY BASIC ALTAIR IN LATE APRIL AND HAD IT ASSEMBLED AND RUNNING IN ABOUT THREE WEEKS. THE QUALITY OF THE PARTS WAS GOOD ALTHOUGH I HAVE NO WAY OF CHECKING THE TIMINGS OF THE MEMORY AND CPU CHIPS. THEY DID CARRY THE INTEL NAME AND I HAVE HAD NO PROBLEMS WITH THEM. MITS REPLACED THREE MISSING AND ONE DEFECTIVE PART BY RETURN MAIL WHEN REQUESTED. I WISH THEY WOULD ANSWER QUESTIONS THAT FAST! I RECEIVED A 4K DYNAMIC MEMORY KIT 55 DAYS AFTER ORDERING WHEN THEY WERE PROMISING 60 DAYS. I WAS ABLE TO ASSEMBLE IT, TEST IT, AND START USING IT IN ONE WEEK-END. IT REQUIRES A MODIFICATION TO THE FRONT PANEL PC BOARD TO CHANGE THE TIMING ON THE DEPOSIT AND DEPOSIT NEXT FUNCTIONS TO HANDLE THE REFRESH CYCLE OF THE DYNAMIC MEMORY. CAPACITOR C7 MUST BE CHANGED FROM .001 uf to .0047 uf TO INCREASE THE DELAY TIME. I AM SATISFIED WITH THE HARDWARE I HAVE RECEIVED AND THEY DO DELIVER WHEN THEY PROMISED ALTHOUGH IT IS SLOWER THAN I WOULD LIKE.

I HAVE NOT BEEN ABLE TO GET ANSWERS TO QUESTIONS FROM MITS AND HAVE NOT RECEIVED EITHER THE USERS GROUP INFORMATION OR DOCUMENTATION UPDATES WHICH I PAID FOR. I HAVE FOUND A NUMBER OF ERRORS IN THE DOCUMENTATION BUT HAVE NOT RECEIVED A SINGLE UPDATE ALTHOUGH I HAVE ADVISED THEM OF SEVERAL ERRORS AND A NUMBER OF UNCLEAR AREAS. AN ALTERNATE SOUCE OF HARDWARE INFORMATION IS THE INTELLEC 8/MCS80 HARDWARE REFERENCE MANUAL FROM INTEL FOR $5.00. IT CONTAINS COMPLETE INFORMATION ON THE 8080 CHIP INCLUDING TIMINGS AND HAS SCHEMATICS FOR MEMORY, I/O INTERFACE, AND PROM PROGRAMMER BOARDS. MITS HAS AT BEST A NAIVE PROGRAMMING STAFF AND THE PROGRAMMING DOCUMENTATION FOR MACHINE LANGUAGE PROGRAMMING LEAVES ME COLD. THEIR RECOMMENDATION TO CONTINUALLY LOOP THROUGH A PROGRAM UNTIL YOU STOP LEAVES YOU IN THE MIDDLE OF THE PROGRAM WITH INDETERMINATE RESULTS UNLESS YOU SINGLE STEP TO THE END. IT IS A SIMPLE MATTER TO PUT IN A JUMP INSTRUCTION AT THE END WHICH BRANCHES TO ITSELF. E.G. AT OCTAL POSITION 040 ENTER 303 THEN 040 THEN 000. OR YOU CAN ENABLE INTERRUPTS AND THEN USE THE HALT INSTRUCTION ALTHOUGH THIS MAY HAVE AN OCCASIONAL GLITCH.

THE MINI-MICRO-MART 9101 MEMORIES WORK FINE ON THE 1K STATIC MEMORY BOARD. I RECEIVED THE FIRST TWO WITHIN 10 DAYS BUT HAVE HAD FOUR MORE ORDERED FOR TWO MONTHS. THEY DON'T APPEAR TO BE SHIPPING TO ANYONE AT THIS TIME. MITS MAY BE SLOW AND EXPENSIVE BUT AT LEAST THEY SHIP AS PROMISED.

ON THE SUBJECT OF SOFTWARE PRICES FROM MITS I AM MORE CONCERNED ABOUT THE QUALITY OF THE PRODUCT THAN THE PRICE. I MANAGE A SYSTEMS AND PROGRAMMING GROUP AND OUR INTERNAL COSTS ARE ABOUT $100 A DAY PER PERSON FOR SALARIES AND BENEFITS AND WHEN WE HIRE OUTSIDE COMPANIES IT TYPICALLY RUNS BETWEEN $150 AND $200 PER DAY. YOU WILL HAVE A SUBSTANTIAL INVESTMENT TO PUT TOGETHER A GOOD BASIC SYSTEM. I AM INTERESTED IN THE DIGITAL GROUPS PROGRESS IN THIS AREA OR AS AN ALTERNATIVE WE MIGHT BE ABLE TO DEVELOP A PACKAGE OURSELVES IF ENOUGH NL READERS WERE WILLING TO PARTICIPATE. SURE WOULD BE NICE IF MITS WOULD TELL YOU MORE ABOUT THEIR PRODUCTS BEFORE YOU BUY THEM. DOES ANYONE HAVE THEIR EXTENDED BASIC?

OTHER ITEMS OF INTEREST

JAMES, DIGIKEY, AND BABYLON HAVE BEEN EXCELLENT SUPPLIERS. SOLID STATE SYSTEMS, INC. HAS FURNISHED EXCELLENT QUALITY BUT PRICES ARE A LITTLE HIGH UNLESS YOU CAN CATCH ONE OF THEIR SALES. JUST RECEIVED THE SUDING TVY KIT FROM THE DIGITAL GROUP AND IT LOOKS GOOD. HAVE ORDERED THEIR 8080 PACKAGE BUT HAVE NOT RECEIVED IT YET. HAVE RECEIVED NO INFORMATION FROM EITHER THE COMPUTER HOBBYIST OR THE PEOPLES COMPUTER COMPANY SINCE SENDING IN SUBSCRIPTIONS ALMOST TWO MONTHS AGO.

I have also had problems with delivery from Mini-Micro-Mart on a keyboard and on 9101 memory IC's. James, Digikey and Babylon have been excellent. I am in the process of modifying the 28 volt keyboard from Babylon (TRW touch-tone type) to a 5 volt octal/binary input device. I just received the Suding TVY kit and was impressed with the quality. I bought several of the Intel Manuals and found two to be exceptionally good for 8080 owners. The INTELLEC 8/MCS80 Hardware reference Manual gives you most of the information you can't get from MITS including schematics for memory boards, interfaces, and PROM boards and programmer. The 8080 Assembler Language Manual looks like an excellent book on programming at first glance. They are $5.00 @ and were shipped almost by return mail from Intel.

Don H. Morrison

Don H. Morrison
313-642-0175

10 Jul 75

Lee C. Hanson
1514 Fremont Ave.
Cheyenne, Wy 82001

I ordered one of the CREED TTY's and when it arrived it was missing the two rear feet. I asked for replacements and they came with no problems. (Wish Mini Micro Mart was run the same way). I'm having a problem with the TTY though, it executes and punches a CR itself. It doesn't care if I'm in the middle of a word, it does it anyway. I wrote to Wilcox Ent. about it and XXXX I'll let you know the kind of responce I recieve. I would like you to pass it along that they have helped me so far just as they said they would.

You know I've been working on getting my Mark-8 running for almost ten months now and I think I'm going to get all the bugs out in the next couple of weeks, Thanks to your NL I've gotten good bug reports and many sources for individual help. I believe my problems have all been bad IC's (IEU). I now recommend JAMES. Thank you for taking the time to put out such a fine NL.

Sincerly,

Lee C Hanson

LEE C. HANSON

3112 Lois Place
Highland, Indiana 46322

6/29/75

Gentlemen:

You will find enclosed two drawings of an I/O scheme I have designed, built and implemented on my Altair 8800. It decodes Device addresses 0 thru 4 and routes the input and output strobes from the computer to the proper devices. Device 0 is used for data ready flags from external devices. The flags are interrogated by software instructions and also reset by software instructions. Only two flag circuits are shown and 6 more of the same can be wired into the Tri-state buss drivers on Dev. 0.

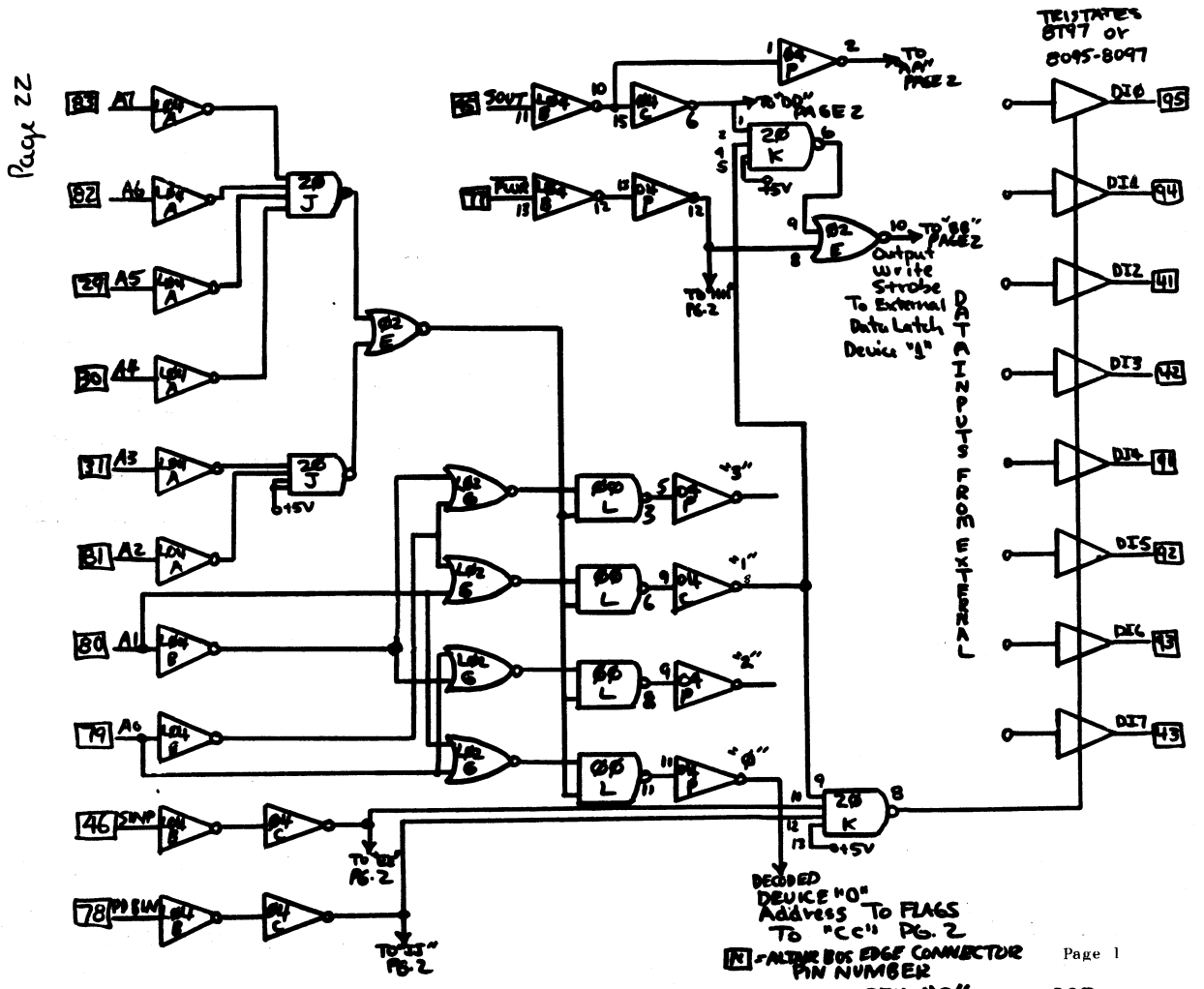
Only one typical write strobe decoder is shown on page one for external devices but two more, for Dev. 2 & 3 can be added. Ic "J" can be changed to L20 and readdressed to any desired slot in the 256 I/O addresses.

External data latches can be connected in parallel to the outputs. A decoded write strobe goes to each 8 bit latch(74100). These can be used to operate relays or what have you.

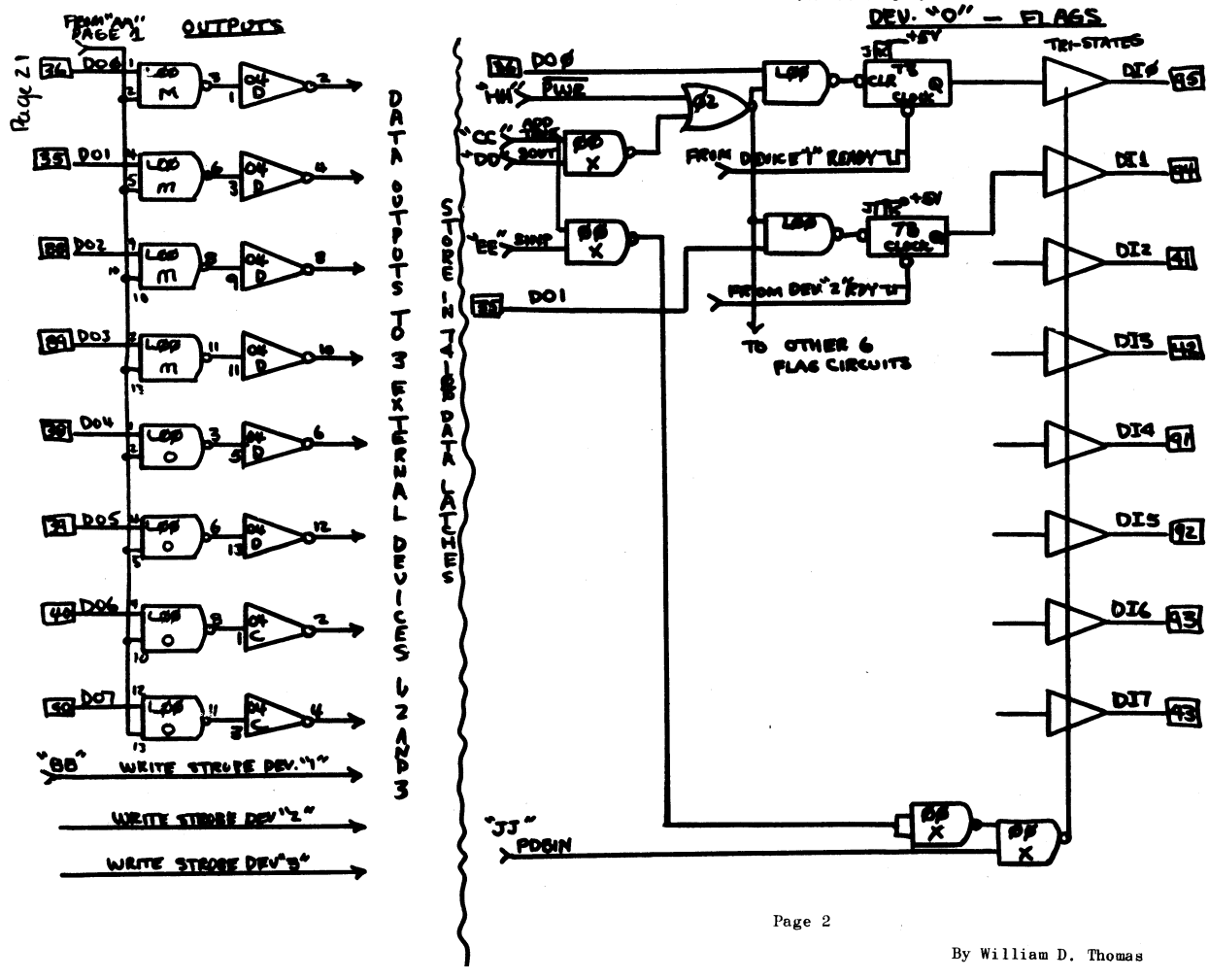
Only one Processor Data Bus Input strobe is shown decoded. Again any number of decoders can be implemented, one for each input device.

If you etch yourself a 100 pin plug from doublesided board you can build your I/O's on Vector pre-etched cards that plug into a 44 pin Vector edge connector. Install several of them in a homemade or other cage and wire them parallel. Assign transition pin numbers, wire the cage to the 100 pin plug you etched and plug into the Altair Bus. These Vector cards aren't cheap but you have the advantage of not having to etch complicated boards as they can be wired point to point. Use Molex pins for your IC's and do not break off the carriers until you have finished soldering and are ready to install the IC's. Feel free to change the circuits around to suit yourself but interface with the 8800 bus with low power loads only.

William D. Thomas



Page 1



Page 2

By William D. Thomas

26 March 1975
P. O. Box 217
Quechee, VT 05059

I received the latest newsletter, and it was great. I hope that the next one lets us out in the boonies know what has been decided for the future.

I received a copy of the Microsystems International MF8008 Applications Manual and was impressed with Monitor 8. I have started getting ideas on how to expand it and what to add.

I'm now trying to form a library of software, collecting all samples of programs and routines for the 8008 and (hopefully) the 8080. From the last newsletter, I understand that you have copies of several different software examples available. For example - Paul Farr's modifications for TVT, and Terry Ritter's executive monitor system. I would like to obtain copies of any and all available software to add to the library, including routines, programs, assemblers, monitors, editors, cross assemblers, simulators, compilers, etc. As I have access (limited, but...) to the Dartmouth College Timesharing System, I will be able to help develop software for the group. With luck, and a good varied collection, I'd like to help the group by providing copies of software to members for the cost of postage and reproduction. I really would like to get active in the software portion - collecting, distributing, developing, and... writing:

You require a SASE for information and a "camera ready article". Well, I'm the "dummy" that "is going to suggest using hexadecimal notation for the 8008 or 8080". My contributions are first a hexadecimal dump routine that dumps a 4 character address, 2 spaces, and 2 character data word per word of memory for each line outputed. You supply the ending and starting address in register pairs D&E and H&L, respecively. The second contribution is a table giving the decimal, octal, hexadecimal, mnemonic, and description of all the 8080 instructions (comparable to Adam Trent's for the 8008, I presume - which, by the way, can be found in Intel's MCS-8 User's Manual)

I hope that these are satisfactory, as I haven't got a system to write about yet, only the 8008 chip and a dream.

I suggested this in my last letter, but I'd like to ask about it again. The suggestion was this - that the Group, as a whole, buy the cross assembler, simulator, and PL/M compiler packages from Intel to help in software development. What I'd like to know is if you think it is good idea.

My enthusiasm in the software side of the Group is pretty obvious. As I have no Mark-8 or other hardware to build and work with, I end up concentrating my energies in the programming end of things. My ideas for my own future system include a lot of complicated system software (a timesharing system, would you believe!). Hence, my clammering for software already written.

So, after my immense request, I hope that I haven't wasted your time. I would like to start the group's software library or help with it if it is already started elsewhere.

For all the trouble I may have caused, and for just being a part of the group - please find enclosed the following:

A copy of my hexadecimal dump routine
A copy of the 8080 Instruction set
A check for the amount of $6.00 for the next 6 issues

I hope that I have included everything. I'm anxiously waiting for the next issue of the newsletter.

Thanks for the help....

I am,
very respectfully yours,

Sid Maxwell

HEXADECIMAL DUMP SUBROUTINE:

note: This routine assumes that registers D and E contain the address of the last word to be dumped, and registers H and L the first. Note also that the output is only and OUT instruction due to the varied output formats - this must be changed for each individual case....

```
0000  C5       START:  MOV  A,H    ;move high add of data to A...
0002  460037            CALL HIGH   ;  and output high order char
0005  C5                MOV  A,H    ;move high address again...
0006  460040            CALL LOW    ;  and output low order char
0009  C6                MOV  A,L    ;move low add of data to A...
000A  460037            CALL HIGH   ;  and output high order char
000D  C6                MOV  A,L    ;move low address again...
000E  460040            CALL LOW    ;  and output low order char
0011  0620              MVI  A,20   ;load A with a " ", 20 hex...
0013  XX                OUT  EXP    ;  and output to port EXP...
0014  XX                OUT  EXP    ;    twice for two blanks
0015  D7                MOV  C,M    ;now bring data word (H & L add)...
0016  C2                MOV  A,C    ;  to C and then to A (saved in C)
0017  46004B            CALL HIGH2  ;output high order character
001A  C2                MOV  A,C    ;load data word again and...
001B  460040            CALL LOW    ;  output low order character
001E  060D              MVI  A,0D   ;load A with a CR, 0D hex...
0020  XX                OUT  EXP    ;  and output to port EXP
0021  060A              MVI  A,0A   ;load A with a LF, 0A hex...
0023  XX                OUT  EXP    ;  and output to port EXP
0024  C5                MOV  A,H    ;load A with high add of data...
0025  BB                CMP  D      ;  and compare with high add of last
0026  40002F            JNC  OK     ;if present add is less, OK
0029  C6                MOV  A,L    ;otherwise, load L to A and...
002A  BC                CMP  E      ;  compare with E (low add's)
002B  40002F            JNC  OK     ;if we still have more, OK
002E  07                RET         ;otherwise, we're done
002F  30       OK:      INR  L      ;if we're not done, incr add...
0030  480000            JNZ  START  ;
0033  28                INR  H      ;
0034  440000            JMP  START  ;  and go back for next add and data
0037  2430     HIGH:    ANI  30     ;mask out top 2 signif bit of high add
0038  1A                RAR         ;rotate to...
0039  1A                RAR         ;  move bits...
003A  1A                RAR         ;    down to the...
003B  1A                RAR         ;      lowest position
003C  460040            CALL LOW    ;now output this "low order" char
003F  07                RET         ;done
0040  240F     LOW:     ANI  0F     ;mask out low order 4 bits...
0041  3C0A              CPI  0A     ;  and see if less than 10 decimal
0042  600047            JC   ALPHA  ;if not, will be an A-F (hex alpha char)
0045  243F              ANI  3F     ;otherwise, is numeric, so add prefix
0046  XX                OUT  EXP    ;  for numeric ASCII, and output
0047  1C09     ALPHA:   SBI  09     ;if alpha, sud 9 dec to shift down...
0048  244F              ANI  4F     ;  and add ASCII capitals' prefix...
0049  XX                OUT  EXP    ;    and output to port EXP
004A  07                RET         ;done
004B  24F0     HIGH2:   ANI  F0     ;for data, mask out top 4 bits
004D  1A                RAR         ;rotate to...
004E  1A                RAR         ;  move bits...
004F  1A                RAR         ;    down to the...
0050  1A                RAR         ;      lowest position
0051  460040            CALL LOW    ;now output this "low order" char
0054  07                RET         ;done
                        END
```

8080 Machine Instruction Codes:
note - only the first word of multiple word instructions is presented

DEC	OCTAL	HEX	MNEMONIC	COMMENT
000	000	00	NOP	No-Operation
1	001	01	LXI B	Load immediate register pair B-C
2	002	02	STAX B	Store A indirect
3	003	03	INX B	Increment B & C registers
4	004	04	INR B	Increment register B
5	005	05	DCR B	Decrement register B
6	006	06	MVI B	Move immediate to B
7	007	07	RLC	Rotate A left
8	010	08	---	
9	011	09	DAD B	Add B & C to H & L
10	012	0A	LDAX B	Load A indirect
11	013	0B	DCX B	Decrement B & C
12	014	0C	INR C	Increment register C
13	015	0D	DCR C	Decrement register C
14	016	0E	MVI C	Move immediate to C
15	017	0F	RRC	Rotate A right
16	020	10	---	
17	021	11	LXI D	Load immediate reister pair D-E
18	022	12	STAX D	Store A indirect
19	023	13	INX D	Increment D & E registers
20	024	14	INR D	Increment register D
21	025	15	DCR D	Decrement register D
22	026	16	MVI D	Move immediate to D
23	027	17	RAL	Rotate A left through carry
24	030	18	---	
25	031	19	DAD D	Add D & E to H & L
26	032	1A	LDAX D	Load A indirect
27	033	1B	DCX D	Decrement D & E
28	034	1C	INR E	Increment register E
29	035	1D	DCR E	Decrement register E
30	036	1E	MVI E	Move immediate to E
31	037	1F	RAR	Rotate A right through carry
32	040	20	---	
33	041	21	LXI H	Load immediate register pair H-L
34	042	22	SHLD	Store H & L direct
35	043	23	INX H	Increment H & L registers
36	044	24	INR H	Increment register H
37	045	25	DCR H	Decrement register H
38	046	26	MVI H	Move immediate to H
39	047	27	DAA	Decimal adjust A
40	050	28	---	
41	051	29	DAD H	Add H & L to H & L
42	052	2A	LHLD	Load H & L direct
43	053	2B	DCX H	Decrement H & L
44	054	2C	INR L	Increment register L
45	055	2D	DCR L	Decrement register L
46	056	2E	MVI L	Move immediate to L
47	057	2F	CMA	Compliment A
48	060	30	---	

DEC	OCTAL	HEX	MNEMONIC		COMMENT
49	061	31	LXI	SP	Load immediate stack pointer
50	062	32	STA		Store A direct
51	063	33	INX	SP	Increment stack pointer
52	064	34	INR	M	Increment memory
53	065	35	DCR	M	Decrement memory
54	066	36	MVI	M	Move immediate to memory
55	067	37	STC		Set carry
56	070	38	---		
57	071	39	DAD	SP	Add stack pointer to H & L
58	072	3A	LDA		Load A direct
59	073	3B	DCX	SP	Decrement stack pointer
60	074	3C	INR	A	Increment register A
61	075	3D	DCR	A	Decrement register A
62	076	3E	MVI	A	Move immediate to A
63	077	3F	CMC		Compliment carry
64	100	40	MOV	B,B	Move B to B
65	101	41	MOV	B,C	Move C to B
66	102	42	MOV	B,D	Move D to B
67	103	43	MOV	B,E	Move E to B
68	104	44	MOV	B,H	Move H to B
69	105	45	MOV	B,L	Move L to B
70	106	46	MOV	B,M	Move memory to B
71	107	47	MOV	B,A	Move A to B
72	110	48	MOV	C,B	Move B to C
73	111	49	MOV	C,C	Move C to C
74	112	4A	MOV	C,D	Move D to C
75	113	4B	MOV	C,E	Move E to C
76	114	4C	MOV	C,H	Move H to C
77	115	4D	MOV	C,L	Move L to C
78	116	4E	MOV	C,M	Move memory to C
79	117	4F	MOV	C,A	Move A to C
80	120	50	MOV	D,B	Move B to D
81	121	51	MOV	D,C	Move C to D
82	122	52	MOV	D,D	Move D to D
83	123	53	MOV	D,E	Move E to D
84	124	54	MOV	D,H	Move H to D
85	125	55	MOV	D,L	Move L to D
86	126	56	MOV	D,M	Move memory to D
87	127	57	MOV	D,A	Move A to D
88	130	58	MOV	E,B	Move B to E
89	131	59	MOV	E,C	Move C to E
90	132	5A	MOV	E,D	Move D to E
91	133	5B	MOV	E,E	Move E to E
92	134	5C	MOV	E,H	Move H to E
93	135	5D	MOV	E,L	Move L to E
94	136	5E	MOV	E,M	Move memory to E
95	137	5F	MOV	E,A	Move A to E
96	140	60	MOV	H,B	Move B to H
97	141	61	MOV	H,C	Move C to H
98	142	62	MOV	H,D	Move D to H
99	143	63	MOV	H,E	Move E to H
100	144	64	MOV	H,H	Move H to H
101	145	65	MOV	H,L	Move L to H

DEC	OCTAL	HEX	MNEMONIC		COMMENT
102	146	66	MOV	H,M	Move memory to H
103	147	67	MOV	H,A	Move A to H
104	150	68	MOV	L,B	Move B to L
105	151	69	MOV	L,C	Move C to L
106	152	6A	MOV	L,D	Move D to L
107	153	6B	MOV	L,E	Move E to L
108	154	6C	MOV	L,H	Move H to L
109	155	6D	MOV	L,L	Move L to L
110	156	6E	MOV	L,M	Move memory to L
111	157	6F	MOV	L,A	Move A to L
112	160	70	MOV	M,B	Move B to memory
113	161	71	MOV	M,C	Move C to memory
114	162	72	MOV	M,D	Move D to memory
115	163	73	MOV	M,E	Move E to memory
116	164	74	MOV	M,H	Move H to memory
117	165	75	MOV	M,L	Move L to memory
118	166	76	HLT		Halt
119	167	77	MOV	M,A	Move A to memory
120	170	78	MOV	A,B	Move B to A
121	171	79	MOV	A,C	Move C to A
122	172	7A	MOV	A,D	Move D to A
123	173	7B	MOV	A,E	Move E to A
124	174	7C	MOV	A,H	Move H to A
125	175	7D	MOV	A,L	Move L to A
126	176	7E	MOV	A,M	Move memory to A
127	177	7F	MOV	A,A	Move A to A
128	200	80	ADD	B	Add B to A
129	201	81	ADD	C	Add C to A
130	202	82	ADD	D	Add D to A
131	203	83	ADD	E	Add E to A
132	204	84	ADD	H	Add H to A
133	205	85	ADD	L	Add L to A
134	206	86	ADD	M	Add memory to A
135	207	87	ADD	A	Add A to A
136	210	88	ADC	B	Add B to A with carry
137	211	89	ADC	C	Add C to A with carry
138	212	8A	ADC	D	Add D to A with carry
139	213	8B	ADC	E	Add E to A with carry
140	214	8C	ADC	H	Add H to A with carry
141	215	8D	ADC	L	Add L to A with carry
142	216	8E	ADC	M	Add memory to A with carry
143	217	8F	ADC	A	Add A to A with carry
144	220	90	SUB	B	Subtract B from A
145	221	91	SUB	C	Subtract C from A
146	222	92	SUB	D	Subtract D from A
147	223	93	SUB	E	Subtract E from A
148	224	94	SUB	H	Subtract H from A
149	225	95	SUB	L	Subtract L from A
150	226	96	SUB	M	Subtract memory from A
151	227	97	SUB	A	Subtract A from A
152	230	98	SBB	B	Subtract B from A with borrow
153	231	99	SBB	C	Subtract C from A with borrow
154	232	9A	SBB	D	Subtract D from A with borrow

DEC	OCTAL	HEX	MNEMONIC	COMMENT
208	320	D0	RNC	Return on no carry
209	321	D1	POP D	Pop register pair D & E off stack
210	322	D2	JNC	Jump on no carry
211	323	D3	OUT	Output
212	324	D4	CNC	Call on no carry
213	325	D5	PUSH D	Push register pair D & E on stack
214	326	D6	SUI	Subtract immediate from A
215	327	D7	RST 2	Restart at position 020 octal
216	330	D8	RC	Return on carry
217	331	D9	---	
218	332	DA	JC	Jump on carry
219	333	DB	IN	Input
220	334	DC	CC	Call on carry
221	335	DD	---	
222	336	DE	SBI	Subtract immediate from A with borrow
223	337	DF	RST 3	Restart at position 030 octal
224	340	E0	RPO	Return on odd parity
225	341	E1	POP H	Pop register pair H & L off stack
226	342	E2	JPO	Jump on odd parity
227	343	E3	XTHL	Exchange top of stack, H & L
228	344	E4	CPO	Call on odd parity
229	345	E5	PUSH H	Push register pair H & L on stack
230	346	E6	ANI	And immediate to A
231	347	E7	RST 4	Restart at position 040 octal
232	350	E8	RPE	Return on even parity
233	351	E9	PCHL	H & L to program counter
234	352	EA	JPE	Jump on even parity
235	353	EB	XCHG	Exchange registers D & E, H & L
236	354	EC	CPE	Call on even parity
237	355	ED	---	
238	356	EE	XRI	Exclusive Or immediate to A
239	357	EF	RST 5	Restart at position 050 octal
240	360	F0	RP	Return on positive
241	361	F1	POP PSW	Pop A and flags off stack
242	362	F2	JP	Jump on positive
243	363	F3	DI	Disable interupt
244	364	F4	CP	Call on positive
245	365	F5	PUSH PSW	Push A and flags on stack
246	366	F6	ORI	Or immediate to A
247	367	F7	RST 6	Restart at position 060 octal
248	370	F8	RM	Return on minus
249	371	F9	SPHL	H & L to stack pointer
250	372	FA	JM	Jump on minus
251	373	FB	EI	Enable interupts
252	374	FC	CM	Call on minus
253	375	FD	---	
254	376	FE	CPI	Compare immediate to A
255	377	FF	RST 7	Restart at position 070 octal

DEC	OCTAL	HEX	MNEMONIC	COMMENT
155	233	9B	SBB E	Subtract E from A with borrow
156	234	9C	SBB H	Subtract H from A with borrow
157	235	9D	SBB L	Subtract L from A with borrow
158	236	9E	SBB M	Subtract memory from A with borrow
159	237	9F	SBB A	Subtract A from A with borrow
160	240	A0	ANA B	And B to A
161	241	A1	ANA C	And C to A
162	242	A2	ANA D	And D to A
163	243	A3	ANA E	And E to A
164	244	A4	ANA H	And H to A
165	245	A5	ANA L	And L to A
166	246	A6	ANA M	And memory to A
167	247	A7	ANA A	And A to A
168	250	A8	XRA B	Exclusive Or B to A
169	251	A9	XRA C	Exclusive Or C to A
170	252	AA	XRA D	Exclusive Or D to A
171	253	AB	XRA E	Exclusive Or E to A
172	254	AC	XRA H	Exclusive Or H to A
173	255	AD	XRA L	Exclusive Or L to A
174	256	AE	XRA M	Exclusive Or memory to A
175	257	AF	XRA A	Exclusive Or A to A
176	260	B0	ORA B	Or B to A
177	261	B1	ORA C	Or C to A
178	262	B2	ORA D	Or D to A
179	263	B3	ORA E	Or E to A
180	264	B4	ORA H	Or H to A
181	265	B5	ORA L	Or L to A
182	266	B6	ORA M	Or memory to A
183	267	B7	ORA A	Or A to A
184	270	B8	CPA B	Compare B to A
185	271	B9	CPA C	Compare C to A
186	272	BA	CPA D	Compare D to A
187	273	BB	CPA E	Compare E to A
188	274	BC	CPA H	Compare H to A
189	275	BD	CPA L	Compare L to A
190	276	BE	CPA M	Compare memory to A
191	277	BF	CPA A	Compare A to A
192	300	C0	RNZ	Return on no zero
193	301	C1	POP B	Pop register pair B & C off stack
194	302	C2	JNZ	Jump on no zero
195	303	C3	JMP	Jump unconditionally
196	304	C4	CNZ	Call on no zero
197	305	C5	PUSH B	Push register pair B & C on stack
198	306	C6	ADI	Add immediate to A
199	307	C7	RST 0	Restart at position 000 octal
200	310	C8	RZ	Return on zero
201	311	C9	RET	Return unconditionally
202	312	CA	JZ	Jump on zero
203	313	CB	---	
204	314	CC	CZ	Call on zero
205	315	CD	CALL	Call unconditionally
206	316	CE	ACI	Add immediate with carry
207	317	CF	RST 1	Restart at position 010 octal

Grant Runyan, 1146 Nirvana Road, Santa Barbara, CA 93101 has the following to say: My TVT-1 is working fine with the R. D. Hogg scrolling. I added the UART and am just about ready to hook it up with a surplus acoustic coupler to have a terminal from our school system's Nova-2.
I finally decided to build a Mark-8 and am assembling the parts. I ordered the circuit boards from Techniques, Inc. on June 15 and received word on July 16 that they were out of stock and could not be delivered until the middle of September. That will give me time to work out an interface with the Flexowriter which I bought. If anyone else is trying to interface a Flexowriter, drop me a line, and let's compare notes.
In searching for a power supply for the Mark-8, I found that both sources listed in PE's booklet are out of business. I was able to find an excellent power supply taken from a keyboard terminal. In fact, it is so good that I bought all that were available and have about 20 for sale. This is a 5 volt supply highly regulated at 6 amps. It also has 200 v., 12 v., and 48 v. It will be easy to convert to obtain -5 v., -12 v., and - 9 volts. I would like to have $25.00 each for these supplies. I will supply schematics and plans for obtaining the other voltages if needed. They weigh about 15 pounds, so the freight will be as high as $5.00 for points on the east coast. Freight in California will be about $1.00, and I will have to charge 6% tax to California addresses.
I have been able to get quite a library of computer information on microfiche film. I bought a little micro reader from National Microsales, 45 Seymour St., Stratford, Conn. 06497, for $25 which is really great. I recommend this instrument very highly for home use and recommend that people send for the flyer on the reader.
Thanks millions for all your work on the newsletter. I would certainly not be able to participate in this fun game without the information from the NL.

Keith L. Kendall
295 E 500 So
Vernal, Utah 84078

July 11, 1975

I have purchased some smoke damaged Beehive monitors & Beehive keyboards. I haven't seen them yet but am informed that they are workable with cleaning. Unfortunately the cases were sold separately to a junk man. The monitors do not have memory or character generators, etc. but have power and deflection circuits.

I paid $25 each for the monitors & $25 each for the keyboards (microswitch, ASCII). If you think anyone would be interested I will check into getting more and a better price. (CENCL: SASE)

Also I have quite a few BASIC language games and will reproduce them for cost. More later. I haven't got anything running yet except a Univac terminal, punch, & reader, & an Altair, and haven't connected them yet. I may just breadboard a 2-port or so interface until the interface that I ordered from Maury Goldberg June 7th comes. When I ordered it he talked like it would be shipped immediately, but although he shipped some of it air mail, I havent yet received the rest. I am pleased with Poly Packs.

Yours,

Keith L Kendall

Keith L. Kendall

James J. Dunion
421 Ridgecrest Road, N. E.
Atlanta, Georgia 30307

ZERO'ING MEMORY IN THE 8080
(I MEAN REALLY ZERO'ING MEMORY)

I was browsing through the Newsletter the other day and came across William Shawcross' program to clear memory (Vol. 1, No. 7, Page 5). I glanced at this with fondness, because the first program I tackled with my "bare bones" Altair was one to clear memory. But even programs this simple can certainly be instructive. For instance, I was horified to see that Mr. Shawcross cheated. I mean, after you stop the program, there's that section of code from 362_8 on up lurking around. Okay, so how can you devise a program that clears every thing, even itself. I discovered that this is no trivial problem. To solve it, I devised a two part program. The first section "builds" a small kernel of code, and then transfers control to it. The kernel then sits there and gobbles up memory (i.e. zero's memory). The trick is, on the last bite, it gobbles itself.

The kernel is simplicity itself:

LOC	CODE	OPERATION
000	325	PUSH D
001	351	PCHL

In setting up this kernel, HL is set to 0, so that executing PCHL reactivates the kernel. Also DE is set to 0, so that executing PUSH D "gobbles" the two bytes of memory pointed at by the stack pointer. The only other initialization step is to set the stack pointer to the upper end of memory that is to be cleared. Each time PUSH D is executed, it steps down through memory clearing two bytes at a time. Since the kernel resides at 000-001, the last push operation that is performed wipes out the kernel itself. To avoid the hassle of figuring out what code represents the top part of available memory and loading that valve in the stack pointer, a short cut is just to load 000 000 in the S. P. The kernel

then takes the precaution of clearing every thing, whether memory happens to be there or not. This brings up a good point, it's perfectly acceptable to read and write from memory not physically present on the Altair. If you're writing, the data simply disappears. If you're reading, a 377_8 is returned (i.e. all 1's on the data bus).

Okay, one final problem. After the kernel self-destructs, what's left? Every memory location containing 000. So the processor steps through memory executing 000 which, conveniently is a no operation. Eventually, the processor runs out of memory physically present. When the processor tries to access memory that is not there, a 377 is returned. This turns out to be the code for RST 70 / restart at location 70. Great I thought. The processor will just sit there no-op'ing and looping till I stop it. And so it did. This is, until once I decided to keep the machine running to impress my wife. Then strangely after 1 minute and 35 seconds of running time the stable pattern of lights suddenly changed. What happened? So I tried it again, and sure enough, right on the nose, 1 minute and 35 seconds after starting the program (hah! A whole machine full of no-ops) bombs. Very strange. Hardware bug? Random error? The answer, as I discovered after much thoughtful examination involves careful consideration of exactly what the processor does when it executes the NO-OP machine. I'll send in the answer in my next letter.

LOC	CODE (OCTAL)	OPERATION
000	061	LXI SP, END / set the
001	000	/ stack pointer so that all
002	000	/ of memory will be clear
003	041	LXI H, ZERO / set memory
004	000	/ location pointer to location
005	000	/ zero
006	021	LXI D, ZERO / set register pair
007	000	/ DC to zero - this is the
010	000	/ constant that will be pushed into memory
011	066	MVI, M INST1 / move "PUSH D" to loc. 0
012	325	/ this is the code for "PUSH D"
013	043	INX H / set memory pointer to loc. 2
014	066	MVI M, INST. 2 / move "PCHL" to loc. 1
015	351	/ this is code for "PCHL"
016	053	DCX H / Reset HL to loc. 0
017	351	PCHL

SCELBI COMPUTER CONSULTING, INC.
SCIENTIFIC - ELECTRONIC - BIOLOGICAL PRODUCTS AND SERVICES
1322 REAR - BOSTON POST ROAD
MILFORD, CONNECTICUT 06460
PHONE (203) 874-1573

July 14, 1975

Mr. Hal Singer
Cabrillo Computer Center
4350 Constellation Rd.
Lampoc, CA 93436

Dear Mr. Singer:

A recent issue of the Newsletter featured some comparisons of audio tape interfaces. The SCELBI Audio Tape Interface was one of those mentioned in the discussions. We believe the tone of the discussions might lead some readers to believe that the SCELBI interface was being considered for general use with various microprocessors. We would like, therefore, to point out that the SCELBI interface was designed specifically for the SCELBI Minicomputer. Many of the parameters discussed in the comparisons cannot be properly judged unless one takes account of the following factors.

A.) The relatively large amount of I.C.s used on the transmit side of the SCELBI interface provide functions and capabilities that the units it was compared with did not have.

1. The SCELBI unit incorporates a frequency dividor network so that the computer's master clock may be used to derive the FSK frequencies and completely eliminate transmit frequency adjustments.

2. The SCELBI unit allows start/stop tape motion control by the computer and provides for a delay for the tape unit to reach proper speed before a write operation.

3. The SCELBI unit accepts four bits at a time from the computer to reduce computer processing requirements during a write operation.

4. The SCELBI unit provides a FSK gating function that significantly reduces phase-jitter. A factor that becomes increasingly important as the baud rate increases.

B.) On the receive side, the SCELBI interface is hardly more complicated than Suding's. The basic theory of operation is the same. The SCELBI unit does use an additional I.C. to provide frequency multiplication thus yielding greater bandwidth between the marking and spacing frequencies (to improve the signal/noise ratio between harmonically related signals). Additionally, the SCELBI unit uses an I.C. to generate a minus supply "on-board" which is a feature our designer's elected to include for future developments.

C.) The comparisons of software requirements were hardly representative of similar capabilities. The bytes quoted for SCELBI programs were for routines that included motor start/stop control, "check sum" generation and validation, and error display. More representative figures for minimum read/write capability with the SCELBI unit are on the order of 40 bytes for read and write.

D.) Speed. Over-all through-put with the SCELBI interface is considerably faster than most currently available units.

E.) Compatability - with what? The SCELBI unit is completely compatable with the system for which it was designed. The SCELBI tape unit is used as an integral part of a large array of software that is available for use on SCELBI computers. We did not design it to be compatable with other systems.

In summary, we would like to point out that we think our tape unit is ideal for the system for which it was developed. For those who do not have a SCELBI system, we would not promote our system over any of the other units discussed, and in fact, would recommend those over ours for such applications.

Thank you for your attention.

NW/ab

Nat Wadsworth
President

Radio-Electronics

A GERNSBACK PUBLICATION / 200 PARK AVENUE SOUTH
NEW YORK, N.Y. 10003 / (212) 777-6400

June 19, 1975

Dear Hal:

We're glad to see the success you've been having with the Micro-8 Computer Users Group publication. It is obvious that a lot of work is going into it on your part and an awful lot of benefit is accruing to your subscribers.

We do have several items of interest in progress at Radio-Electronics. While all of them don't directly affect the Micro-8, we just thought you'd like to know about them.

First, there is an article coming up that tells how to interface a programable calculator with the Micro-8. Second, our TV Typewriter II will be expanded with a cursor board and a screen read board. The screen read board should appear in our September, 1975 issue; the cursor board in the October, 1975 issue. We are looking for more articles in the same vein and some of your subscribers certainly have that data available. If they think what they have is suitable for publication in Radio-Electronics, they should get in touch with me. We pay for every article we publish.

We continue to wish you every success with the User Group newsletter and if you feel there is anything we can do to assist, just ask.

Sincerely,

Larry Steckler
Editor

LS:pl

July 7, 1975

Dear TCH and Micro-8 Users Group,

First and foremost i want to congratulate both of you. I think you both have done a fantastic job. TCH is especially to be applauded for their fine series of do-it-yourself type articles and Micro-8 for successfully handling the nearly impossible task of distributing the collective information and opinions from their subscribers.

My only complaint with both publications is that they are so interesting I spend more time reading them than working on my computer.

I have an Altair 8800 with 8¼K of memory, a TTY-28, and a modem. The 8K of memory was purchased from Processor Te chnology Co. , 2465 Fourth Street, Berkeley, CA, 94710. I can recommend them to other Altair users as an excellent supplier of 4K memories and other peripherals. I have on order their 3P+S board (3 parallel and 1 serial I/O interface) a mother-board that will hold up to 16 Altair type boards and their 2K rom board. They are promising almost free software and good documentation. As I said, I'm sold on them for low cost Altair modules.

My TTY is marked TT-47A/UG which seems to be Navy surplus. I have the electrical schmetics if anyone needs one for a SASE.

The modem comes from Bernies Surplus, 20746 Plummer ST., Chatsworth, CA. Bernie sells these modems for about $25. This includes an attractive wooden case, acoustic coupler, modem and documentation.

Future plans include keyboard and TV display (what's the latest on Dr. Sudding's 16x64 character TV display?). I can hardly wait to finish what I have started now so I can build the graphics display as described in TCH by Hal Chamberlin.

I plan on using the TCH cassette interface to maintain compatability with TCH and their future projects. I will probably also use a Tarbell cassette interface for its higher density. Three cassettes will be used to allow sorting to be accomplished with reasonable efficiency.

I definitely want to implement a priority interrupt system and DMA transfer for TV display refresh.

My only problem with the Altair was that the deposit switch would not work most of the time it was pressed. MITS has seen the same problem and recommended the replacement of IC N (74L00) and/or IC G (74123) on the Display Control board. This seemed to help somewhat, but did not completely fix the problem. Finally, after much gnashing of teeth, Don Tarbell came to the rescue and fixed the problem by disconnecting IC G pin 1 from ground and connecting it to pin 13 of IC G. This keeps IC G from extending the width of the MWRITE pulse if it is triggered by switch noise. I haven't contacted MITS about this mod, but it seems to work fine and doesn't seem to affect any other circuits.

Again, my sincerest thanks to you both for your fine publications.

Keep up the good work,

Dave Tritsch

Dave Tritsch
7558 Kester Ave #1
Van Nuys, CA 91405

Hal Singer & John Craig, Editors
Micro-8 Computer User Group News
Cabrillo Computer Center
4350 Constellation Road
Lompoc, CA 93436

July 28, 1975

Dear Hal & John:

Even though A lot of people must be on vacation, I have already received a goot number of responses from people who are willing and interested in joining a "Buyer's Co-operation" for the LSI-11.

Most of the people were interested in getting the Extended Arithmetic Chip along with the Basic LSI-11. The combination would cost, by quantities of fifty, $736. plus tax, shipping, etc. I am sure that this route would give the most "Bang for the Buck".

I am confident that we're going to get 50 people, but maybe a word in the next newsletter would speed up the process. (I am quite anxious!!!!!)

Very truly yours,

Dick Corner

Dick Corner
514 So. 9th St.
Moorhead MN 56560
(218) 236-7894

DC/clt

9730 Townline Div.
Surrey, B.C., Can.
V3V 2T2
July 10, 1975

Page

I just received the # 8 issue of the N.L. and enjoyed it as much as ever. I tell you a lot of guys appreciate all the hard work you are doing for them and our new hobby.

I like the format you have decided on for the N.L. I am a bookbinder by trade, and could probably have helped you decide on a layout had I known you were having a problem. However, you have solved it yourselves, to everyones satisfaction, I'm sure.

I like J.A.Boyko's arrangement of the 8008 Instruction set in this issue of the N.L.For those of us with an octal imput keyboard, this should prove very handy. It also shows the numerical relationship between the different instructions in a very clear fashion.

I still do not have my Mark-8 running. Something is wrong with the single-stepping. xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx As you can see from the enclosed writeup, I have converted to a plug in bus system. Boy, what a difference in convenience.

I have 1 K of 2102 memory working. I purchased the board from Solid State Music and connot praise them highly enough. I received it in the mail about a week after I had mailed in my order. It is a beautifully designed board, and the etching and plating are top-rate, which is more then I can sayfor the original boards. This board holds 4 K of 2102 RAMS, requires no -9 V supply and much less 5 V current. It also includes all necessary decoding.

By the way, the scematic I received from you for the Precision Electroics Power Supply does not jive at all with the power supply I have. I wonder if maybe theyhad two different models?

As I mentioned above, I am enclosing a write up on the low cost plugable bus system I built. Use it if you have a couple of pages to fill up sometimes. Or feel free to condense it if you wish.

From past issues of the N.L., I see that a lot of other guys have become just as frustrated with the Mark 8 bussing system as I have. After trying for a month to debug my machine, and spending about half of that time debugging the bus, broken wires, bad solder connections,trying to get at one board or enother, etc,I decided to take the time and expense and make up a system where I could just plug the boards in or out.

After finding that there were no 43 pin edge connecters available anywhere in Vancouver or Seattle,(and also hearing that they would cost a small fortune if I could obtain any)I hit apon the following scheme. This method allows one to make up wide, expensive edge connecters from narrow, inexpensive,surplus ones. While it sounds like a Mickey Mouse arrangement,I am more then satisfied with the way mine turned out. For a little bit of work, I have saved a lot of bucks which can be better spent elsewhere. Because I was using 22 pin connecters, I made the bus 44 pins wide, giving me 3 spare wires to use for something else if I wish. The same basic arrangement could be used for any width bus, depending on the number of lines needed or the number of pins in the connecters being used.

The following steps and sketch should explain the scheme.

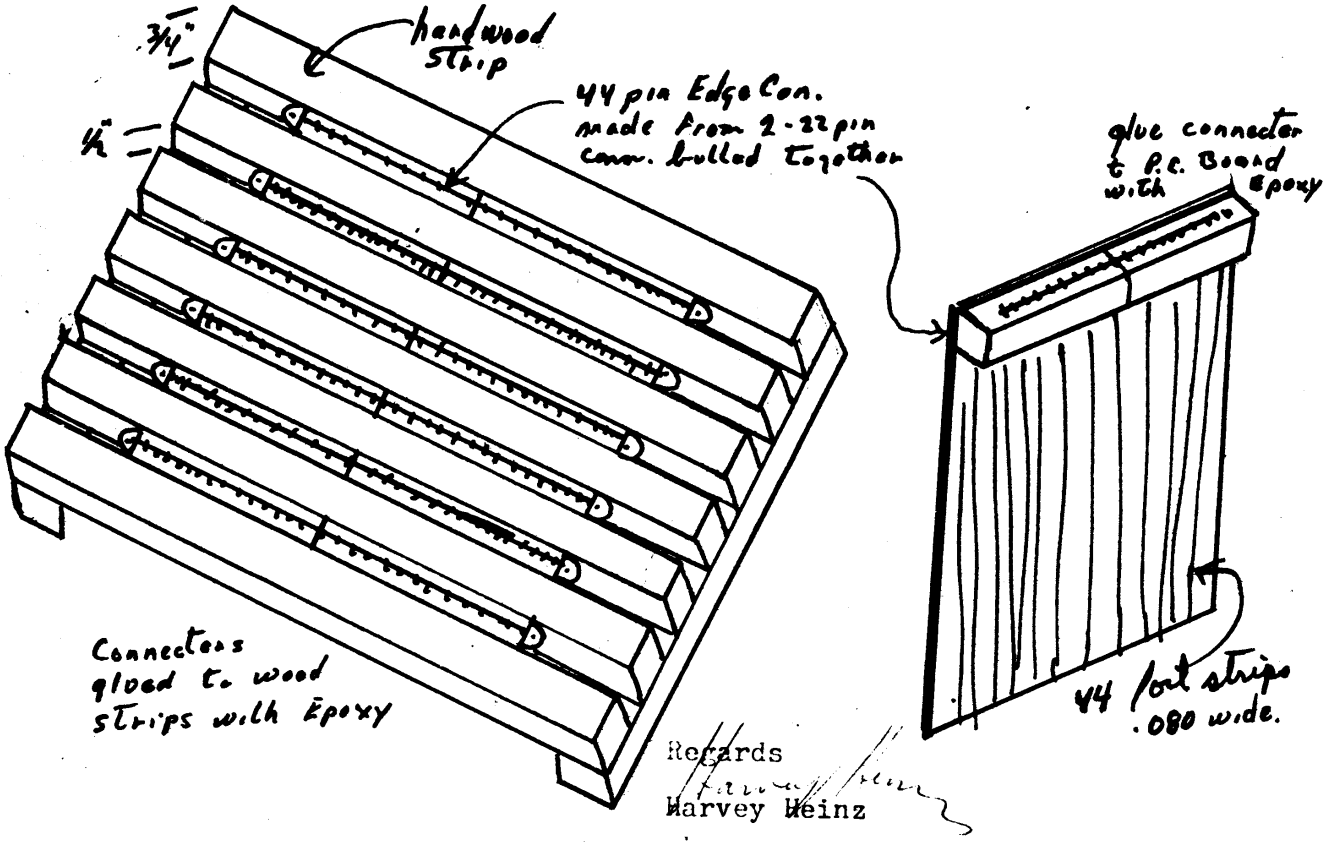
BOARD MODIFICATIONS

1. Prepare artwork 2 x size. I did this by placing a sheet of .005 acetate 15" W. x 13" H over grid paper. I then placed a row of .156 edge connecter pattern (2x size) along the top and bottom edge of the acetate. Then I connected the 2 rows with strips of .160 tape, ending up with 44 strips running from edge to edge of the acetate. Use the grid paper as a guide to insure that the tape strips are absolutely straight.

2. Reduce the artwork photographically to give a negative 7½ x 6½ in.
3. Make 2 Printed Circuit Boards from this negative.
4. Cut 1 board into 6 strips 7½ x about 1 in. Leave the other board full size to use as a card extender.
5. Make up mother board BEFORE continuing with step 6.
6. Clean excess solder off bus pads on Mark 8 boards. I used Dri-wick for this. Then using epoxy cement, glue a connecter strip on each board by overlapping ½ in. and lining up with the bus pads. Place each board between two 1 by 2's and clamp until dry.
7. Connect #22 bare wire jumpers from top end of connecter strip to to P.C. lead by lap soldering. Take CARE to jumper to correct terminal on leads that emerge from under strip at an angle. To connect to leads that are on reverse side of board, simply drill a hole through bus land on board and solder a jumper through it.

MOTHER BOARD -- six 44 pin edge connecters (plus 1 for extender board)

1. Saw 1 end of 22 pin connecter off just past last terminal, using a fine bladed hack saw. Do the same with 13 other connecters.
2. File the end smoth on 2 of these connecters and butt together. Check for correct terminal spacing, with 1 of the P.C.Board strips and if necessary file until the spacing is correct.
3. Do the same with the six other sets.
4. Insert one of the P.C.Board strips in each connecter set to hold alignment and spacing while gluing.
5. Put a thin layer of epoxy along each side of each edge connecter, being CAREFUL none comes near the contacts. Place between previously prepared hardwood strips about ½" h. x ¾" w. x about 10" long. Clamp entire assembly together until throughly dry.
6. Carefully remove P.C.B. strips. Glue or screw strips across ends of wood strips for additional strength. One source of FREE hardwood strips is your local print shop. Ask for used "cutter strips".
7. Wire bus by connecting like numbered terminal pigtails together with #22 bare wire. Remember, imput bus between Imput Multiplexer Board and CPU Board does NOT connect to other boards.
8. Make up an extra 44 pin connecter set and glue it flush with the top edge of the board you left full size. Solder terminal pigtails to foil strips on board. Use this extender board when servicing your Mark 8 to lift the board you wish to work on, above the other boards in the set while still allowing it to be connected to the bus.



Regards

Harvey Heinz

Page

BIT USERS ASSOCIATION

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Sole authorized licensee for hardware, software, parts, patent and copy rights

Richard Koplow,
Secretary

A project of the
RESOURCE ACCESS CENTER
P O Box 11201
Minneapolis, Minnesota 55411
Telephone 612 529-9580

Mr Harold L Singer
Cabrillo High School Computer Center
Lompoc, CA 93436

Gentlemen:

I would very much appreciate the addition of this group, in the name and address below last, to the mailing list for your Mark-8 User Group, and would appreciate any back issues of mailings that can be provided.

The Resource Access Center is a group similar to Resource One in California, just getting underway. We are currently using a system of B.I.T. 483 minicomputers, but are expecting to expand to a moderately large computer this spring and will be using the BITs for communication control and microcomputers in peripheral control applications. We are a voluntary group of, primarily students from local colleges and high schools, and workers in the Minneapolis Model City Program projects. We are very fortunate to have among our active engineers several who are very skilled in microprocessor design. One, who is chief microprocessor consultant to a very large local computer manufacturer has a design of his own, built and debugged, using the 8080 (beats Altair by miles, he says) and I can probably get a copy of the plans for you if you are also interested in the 8080 designs.

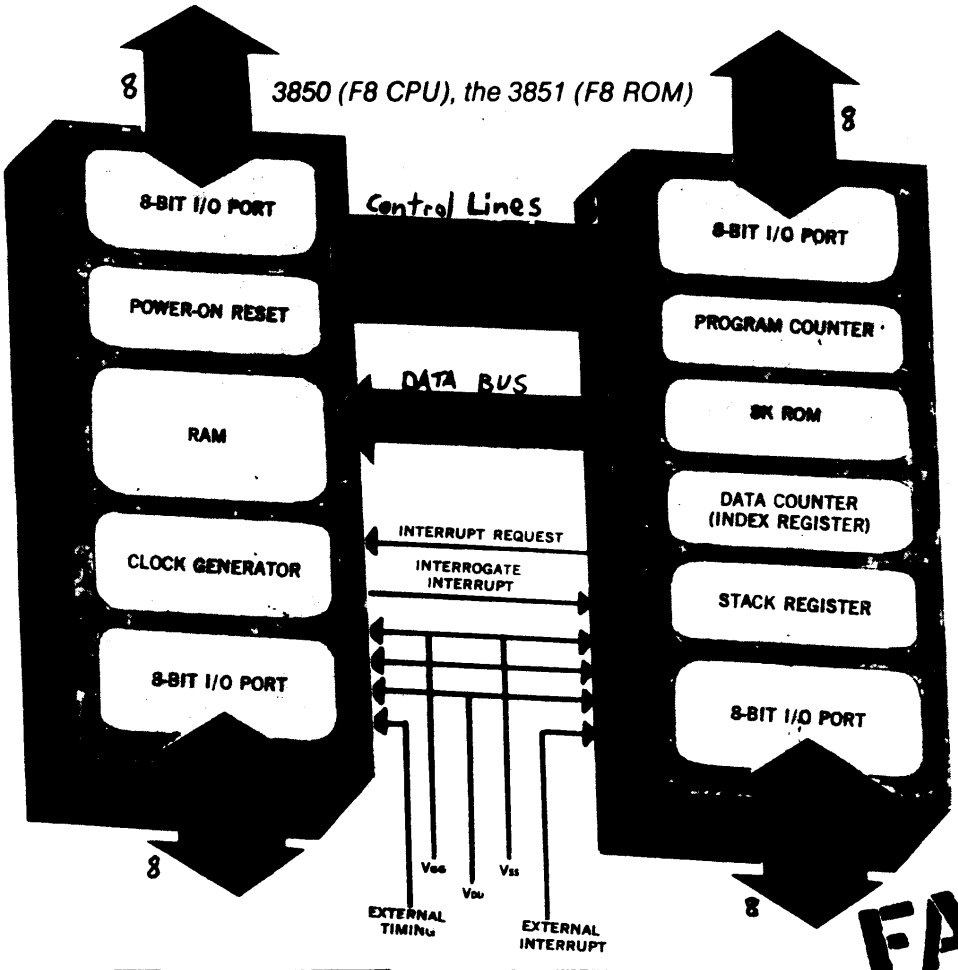
We currently are working on some interesting terminals and will be happy to share the designs. Two, using unmodified TVs, display wide lines of 64 to 80 characters readibly, and another uses the TV for raster scan graphics in 256x200 format. Also improved cassette electronics etc. Layout of the PCs is slow, and anybody interested in sharing this sort of thing should write.
We also bought out the bankrupt BIT computer company, and have all spare parts and new programs, should any of your users' group members happen into one.

Sorry that I can't yet say just what system we will be using soon -- still in negotiations about the donation -- but will keep you informed as to 8008-compatible peripherals & applications.

Richard B. Koplow
RESOURCE ACCESS CENTER
3010 4th Avenue South
Minneapolis, MN 55408

CHARLES FLOTO
267 WILLOW ST
NEW HAVEN CT
06511

a complete 2-chip microprocessor system that's really just 2 chips. easier to handle, much more versatile, and generally less expensive.



THE BASIC F8 SYSTEM AND 5 KEY CHANGES

1. Two 8-bit I/O ports on the CPU chip. And two more on the ROM chip. 32 bidirectional lines in all.
2. 64-bytes of fast RAM scratchpad **built into** the CPU chip.
3. A clock generator and power-on reset **built into** the CPU chip, too.
4. A programmable interval timer **built into** the ROM chip.
5. 60% of the 70 instructions are 1-byte.

Other features and refinements include:
A speedy 2μs minimum instruction execution time.
Direct TTL I/O compatibility.
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Local interrupt with automatic address vector.

FAIRCHILD

Semiconductor Specialists INC.

ELECTRONIC NEWS, MONDAY, JULY 14, 1975

The above is a cut-and-paste job from an ad I found interesting. Note the error in the power connection.

After reading about delivery problems with Mini Micro Mart I went ahead and ordered two 8101's figuring: they might do better on a simple IC order; I could afford to wait; 5¢ per word was too good a memory price to pass up. I mailed my order on Saturday and received two 2101's the following Thursday by UPS.

No faults were detected by my test program. It differs from those published in the NL in that after the test byte has been written, read and compared at each aldress the same is done for the complement of the byte.

So now the only question is what is the difference between the "fully interchangable" 2101 and 8101.

Micro-8 Editors

July 8, 1975
2377 Dalworth 157
Grand Prarie, Tx 75050

I missed the point of Jim Callas' letter as I think he missed the point of mine about Altair. Anyway, it did accomplish two things. It got a contribution from him, and another from me.
In lieu of beating a dead horse, I suggest those interested might read The Computer Hobbyist May 1975 editorial. Maybe it may cause more contributions to the NL.
Since MiniMicroMart can't seem to deliver, an alternate source for 8080/Altair equipment is Processor Technology Co. They are offering Altair compatable add-ons with a 6-month guarentee. The Mart owes me an UART ordered on 4/1/75. Considering the date ordered there must be a cosmic joke there somewhere.
For those disappointed with PE and RE, I suggest shifting support to BYTE coming out in August.
As an aside to the publishing world--most if not all magazines publish anywhere from 3 to 6 issues ahead of issue date. What this means is that corrections to articles made via 'Letter-to-Editor' will be that late in getting to the rest of us. Prices quoted and surplus advertised also will be that much out of date.
I don't know if BYTE will have this problem, but it does have a couple things going for it. Its not published in NYC,and if my communications with Carl Helmers are any indication, the editor is a damn nice guy who knows his 8-byters.
Of course, it goes without saying, if you want fast information, k know what's happening and get a lot of information, support of this NL is a must.
I'm willing to loan my template, felt pen, and time to redraw circuits to make them camera ready for the NL for contributions from Texas and surrounds. To speed up the process and save postage, contributors might consider sending them direct to me and I will redraw and relay them to the NL within 24-hours.

Pax,

Bill

Bill Fuller

---

26 July 1975
Ken A. McGinnis
P.O. Box 2078
San Mateo, Ca. 94401

Dear Hal,

How is everything going? Hope you had a good experience at your recent meeting. The Homebrew Computer Club members here really enjoyed having you visit.

Thought I would write to let you know that the Phi-Decks are now $84.50. Shipping as far as Florida is about $3.50 so include at least that much. California residents include 6% tax or your resale number. Delivery is about 3 to 4 weeks. The price will soon be lower and I will continue to refund any overpayments. There are several groups who are almost finished with controllers (and software) which will be low cost. In addition, several dependable people will soon offer CPU boards with the 8080 which will be considerably lower in cost than the Altair. One may be under $350 with 1K of memory on a 4K board which will accept slower 2102's.

Sincerely,

Ken

Jim Garrett
9253 LBJ Freeway, Apt. 204
Dallas, Texas 75231
234-2004 Home (5-9)
271-2561 Ext. 385 (8-4:30)
July 21, 1975

TO: Hal Singer

FROM: Jim Garrett

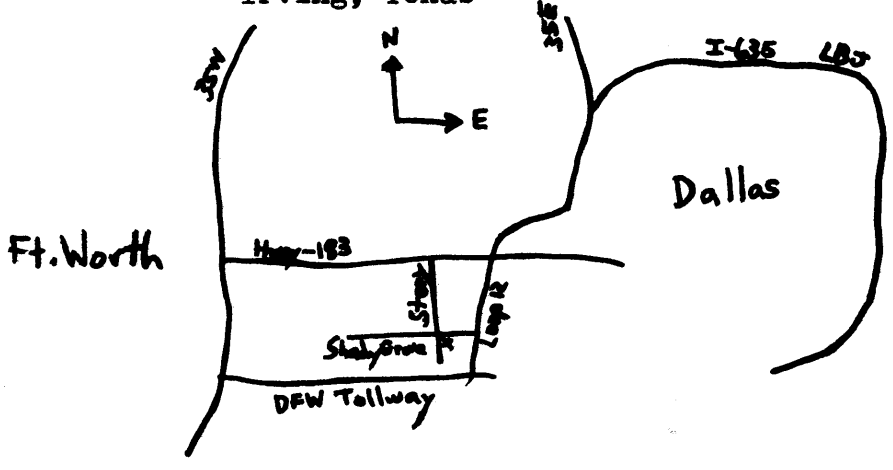
SUBJECT: NORTH TEXAS - DALLAS - FT. WORTH - METROPLEX COMPUTER CLUB MEETING

Lannie Walker, Bill Fuller, and myself are trying to get the amateur computer buffs together in the north Texas area. Our first meeting was a sucess; alot of information and hints were exchanged. In this varied group we have some people with "Homebrews", Altairs, Micro-8's, Mike-2s and other computers.

We would like your help in publicizing our August meeting. Everyone is welcome.

NORTH TEXAS - DALLAS - FT. WORTH - METROPLEX
MEETING

Date: August 18, 1975
Time: 7:00 p.m.
Location: Southwest Branch of the Irving Public Library System
2300 W. Shady Grove
(In shopping center, corner of Shady Grove & Story Rd)
Irving, Texas



If anyone has any questions about the location or how to get there please call me.

Thanks,
Jim
Jim Garrett

MICRO-8 COMPUTER USER GROUP NEWSLETTER
Hal Singer & John Craig -- Editors
Cabrillo Computer Center
4350 Constellation Road
Lompoc, CA 93436

August 28, 1975
Volume 1, #10

Surprise! Another NL in less than a month. Camera ready copy is coming in fast enough to rush another issue out. Believe it or not, the roster of 1500 plus people will appear in one or both of the next issues. Ten issues in 12 months isn't really too bad!

COLOSSAL LEAK

As the newspapers would say, we have it from a "very reliable source" that Radio Shack has firmed up their plans and will announce a modular microcomputer system built around the PACE. (Better write National Semiconductor, 2900 Semiconductor Drive, Santa Clara, CA 95051 (408) 732-5000 and request the PACE technical description, publication #420000784 and the PACE glossy. You might as well ask for full IMP-16 literature at the same time. It looks like we are going to see a lot of National products in the future.) Look for it about January.

Present plans are to set a new trend in pricing with the basic box selling very very cheap to get you to buy reasonably priced expansion modules. Support plans include the complete National support software library and a BASIC.

Word is that National is very anxious to provide support to Radio Shack which only makes sense with the thousands of stores and the potential market they might represent. Can we persuade some of you software experts to take a close look at the PACE instruction set and see whether it will be realistic to modify D-G NOVA software?

MITS & M6800

Rumors are floating about regarding MITS and Motorola M6800 chip development. Rather than repeat some of the ones I've heard, let's quote from Computer Notes, August 1975. The editor Dave Bunnell says, "Yes MITS is working on developments around the M6800 chip. However, it is absolutely not true that we have any plans, notions, thoughts, or intentions of replacing the 8080 CPU with a 6800 CPU. The ALTAIR 8800 is our most powerful processor and it will remain so for a considerable length of time. ALTAIR 8800 development programs are in high gear and ALTAIR owners can be assured that we intend to support them now and indefinitely into the future."

Subscription Information

The MICRO-8 Newsletter is a non-profit publication produced by the students and staff of the Cabrillo High School Computer Center as a student body activity. It is devoted to providing a forum for getting hobby computer enthusiasts communicating with each other and to promote the formation of local hobby computer groups. Issues are published when sufficient worthwhile material has been sent in, preferably every one to two months. Newsletters are sent first class mail to insure that they reach you in a reasonable time. Prices are for U. S. and Canada. Please add $6.00 for foreign delivery.

Back Issues	1 - 4	$3.50		Back Issues 1 - 4 8½ x 11 self addressed envelope with 50¢ stamp
Issues	5 - 12	$6.00	OR	Issues 5 & 6 $3.00
				Issues 7 - 12 $6.00
Total		$9.50		Total $9.50

Heathkit

Wouldn't it be neat to know what Heathkit has on the boards. Word around the Bay area was that Heathkit engineers were making the rounds of the semiconductor manufacturers recently looking at microprocessors.

The Future

What To do after issue 12 still looms ahead. I have to get back to serious school teaching this Fall or I can expect to be fired and John Craig will be in intensive training courses for the next three months but we are still tempted to continue for another 6 issues. Three letters have already been received regarding the NL's future. Please let us know whether we should continue and if so, what kind of changes you'd like to see. In any case, remember that we are not publishing a monthly magazine with our own original work. It is a newsletter that contains your contributions that might be of interest to fellow computer hobbyists.

Sy Lieberman
1489 Durango Avenue
Los Angeles, CA 90035

Dear Hal & John,

It is very gratifying to see that the computer hobby field has grown as rapidly as it has within the last year, resulting in the many low cost hobby microcomputer hardware options now coming out. I am sure that your NL has played a great part in this.

In answer to your request for inputs as to the future of the NL in NL #9, I think you should not stop it with NL #12. As previously stated by Julie Woodman in Volume 1, #8, even if it would require an increased subscription rate (about $10). Her mention of accepting advertising as a possibility for covering required secretarily help appears tempting. However, it would tend to defeat the goal of being completely unbiased source of information for the microcomputer hobby field. Even with such commerical enterprises as BYTE coming out to fill the gap, I am sure that there is room for the NL as they can only handle a limited amount of material in any one issue. Radio Electronics is only doing a very mediocre job in this area as their title covers too much ground. They won't even start a column as Popular Electronics has. The latter is expanding in this area after much letter writing, as the last issue makes note of. I personally think that the unbiased NL provides a sort of hobbyist protector from the "fast buck" artists and their freewheeling advertising and sales staff and that its demise would leave a very large gap. Please consider not stopping the Micro-8 newsletter after issue #12.

Sy Lieberman

August 23

Micro-8 Computer User Group
Cabrillo Computer Center
4350 Constellation Road
Lompoc, CA

Dear Hal;

I received my first copy of BYTE yesterday and was very excited with the content. I think this is a great idea and was badly needed; however, I feel it is important that we do not let a comercial magazine supplant this consumer based information exchange. It is my intention to contribute to the NL every shred of semi-reliable information that I come across.

In that regard, I have received and built the Processor Technology 3P+S I/O board, which should be of interest to all Altair owners. I can think of nothing but superlatives in describing the quality and packaging of the components in this kit. The delivery was a little over a week behind schedule which represents an astounding improvement over the other suppliers I have dealt with. The construction was fairly simple despite some contradiction concerning the orientation of IC 5(the directions and component layout chart are correct, the schematic and pc board are wrong). The completed board has two parellel I/O ports, one control port for talking to the UART, setting flags, software control of baud rate, and controlling peripheral drivers, and one port connected to the transmitt and receive sections of the UART. As you can see, it is a very versatile addition which replaces three I/O boards from a company which shall remain nameless, and all for $125.

There was one area which could be improved upon as regards this product. Suprisingly enough for a firm which advertises free software, there was almost no advice on the possible software options in processing data which moves to and from this device, especially in the area of software control of the UART and using the various flags available. Also, where provision is made for the addition of vectored interrupt capability, there was no mention of pulling PINT low to cause a RESTART 70. I was informed that additional instructions would be following shortly, but I have not received them yet so I can Make no comment on how far they go towards solving these problems.

Another valuable service of the NL is as a communications device between users, and I would like to avail myself of that service to put forth the following plea. I just found an RCA 70/752 video terminal in good working condition, and even though it is old, my Altair is just dying to talk to it. If anyone out there has any info or documentation on this terminal, I will be only too happy to reimburse for expenses you have in purchasing/ copying and mailing it to me. I would even appreciate ideas on where I might find such info.

Here's hoping we don't lose sight of the mutual benefit offered by interaction through the Micro-8 NL.

Sincerely,

Duane L. Gustavus
818 W. Hickory
Denton, Texas 76201

DON L. JACKSON (W7KGU)
P. O. Box 27514
Tempe, AZ 85282
(Telephone: 602-968-9850)

Dear Hal & John,

You wanted reader's reactions to NL volume 2 or not...I would like to see the NL continued for at least a while as long as it is still serving a purpose. I've subscribed to BYTE, but in a hobby field that is changing drastically almost daily, a NL can be the fastest way to disseminate info and rumors.

I would like to see the NL continue along its present lines of including all types of micro-processors. I have both an 8008 and a 6800 operational, and have reasonable expertese in both hardware and software.

Just a hint to pass along to anyone building a 6800 system... if you use the clock driver circuit suggested by Motorola and cannot get the MPQ-6842 quad transister package, try using 2N2222 and 2N2907 transistors. Most will work. (Received this advice straight from big-M) Quite a bit cheaper too!

Have an Intel 4004 system chips for sale if anyone interested. Only one available and very reasonalble. (4004, 4002, 4008, 4009 plus Intel manual) If interested, write for details.

Enclosed is a copy of a letter to Processor Technology, indicating my luck is not as good as other readers indicated in NL #9. Hope it was just a slip-up on their part, since we sure need reliable companies who deliver.

Sincerely,

Don

— COPY —

P. O. Box 27514
Tempe, AZ 85282
August 24, 1975

Processor Technology Co.
2465 - 4th Street
Berkeley, CA 94710

Gentlemen:

On July 22, 1975 I sent you my check #7519 in the amount of $3.00 for your software package #1. To date I have not received this software package #1, but I do have a cancelled check, indicating deposit by you to Crocker National Bank (0300 14376), and charging against my account by my bank on July 29.

As everyone else has praise for you (as indicated in the Micro-8 Users Newsletter), I give you the benefit of doubt at this time that you are not another fly-by-night outfit.

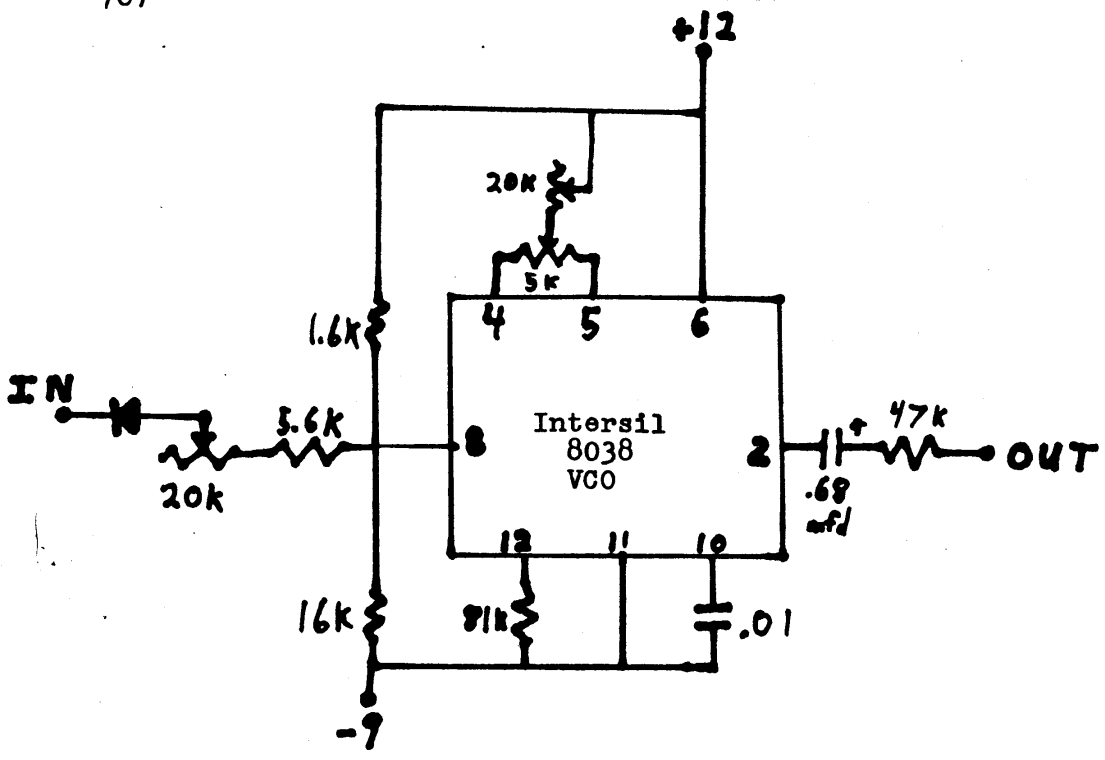
I am also extremely interested in further software, especially BASIC interpreters, and ROMs.

Won't you please check out my order, and if you haven't very recently sent me the software package, to please do so!!!

Sincerely,

Don L. Jackson

Bill Ames, 3804 Miami Road, Cincinnati, Ohio 45227 (513) 272-0884 sent us the following circuit for replacing Suding's triangle wave VCO with a sine wave. He is working on a cursor board for the TVT-II and will send details when completed, and comments that the TVT-II has a parallel load option for the cursor which should allow placing it at any position on the screen quickly and he hopes to work on this soon. He also has LIFE programmed and will send listings soon. (See Scientific American, Oct. 70)



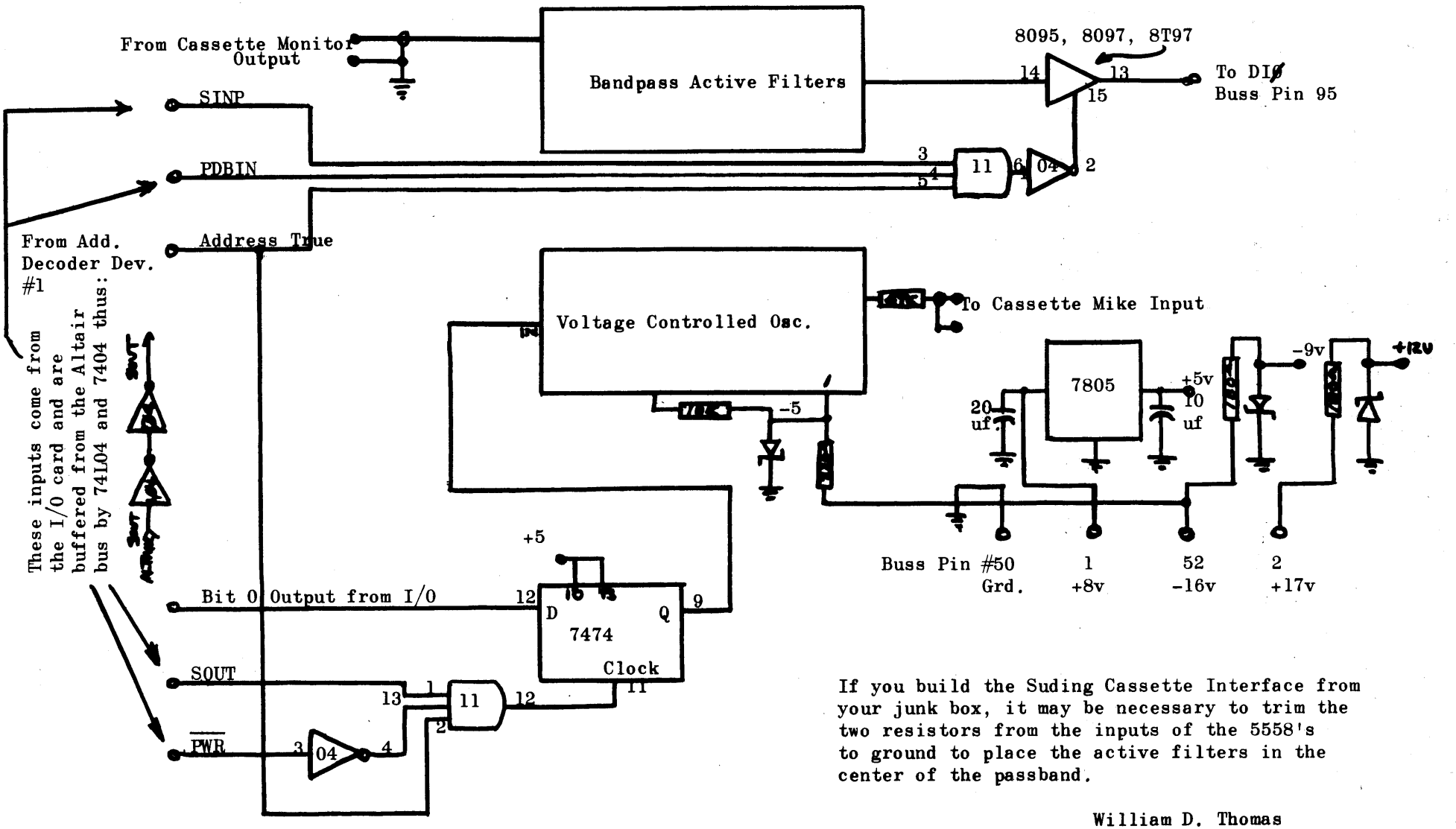
CASSETTE INTERFACE VCO, similar to DR. Suding's, except output of this circuit is a sine wave, instead of Suding's triangle wave. (See NL Vol. 1, #5, p. A-7) Tune up is same, except first adjust pot between pins 4 and 5 for best sine wave (50% duty cycle)

Larry Pleskac, 938 Paula Street, Escondido, CA 92027 writes the following: "More comments on BASIC. I have followed the same steps Terry Ritter has regarding 8008 BASIC. The NTIS report is the same report you can get from IEEE. Following my own advice in my last letter, I wrote to Processor Technology and the Digital Group regarding BASIC. Only the Digital Group replied with "Several of our people are working very hard on a BASIC for the 8008, but it will be some time before its available. The major problem is obtaining enough I/O at a reasonable cost to the hobbyist: We think we have it licked, but the devices are not yet in our hands, so there will be some significant delay." I encourage every 8008 user interested in a BASIC to write the Digital Group. We should form a committee to go after BASIC for the 8008. There must be enough talent in the group so we could start getting software routines in the newsletter. Let's all work on it. The calculator interface should be an excellent starting point. It's unfortunate that the Digital Group choose Mini Micro Mart to handle the unit. Finally, the SWTP keyboard. I haven't seen one good word printed about it. Well, here goes. First--people who buy inexpensive kits should be smart enough not to expect a Heathkit. Second--surplus is fin but what about delivery time. My keyboard is very satisfactory for the price. I use a simple delay circuit to get by the "1".

WILLIAM D. THOMAS
3112 LOIS PLACE
HIGHLAND, IN 46322
PHONE: 838-4454

ALTAIR 8800 LOGIC INTERFACE TO DR. SUDING CASSETTE

Designed to be used with W. Thomas' I/O Scheme
Controlling Software available from
THE DIGITAL GROUP



If you build the Suding Cassette Interface from your junk box, it may be necessary to trim the two resistors from the inputs of the 5558's to ground to place the active filters in the center of the passband.

William D. Thomas
Aug. 3, 1975

WILLIAM E. SEVERANCE, JR.

TELEPHONE
207 925-2271

MAIN STREET
CENTER LOVELL, MAINE 04016

August 2, 1975

Dear Hal or John,

After much procrastination and occupation with hardware, I've finally returned to my element - writing software. TEXTED, my 8008 based text editor program (with an extreme flavoring of DEC's TECO) is beginning to take shape. Presently, it is possible to type in commands, use rubouts to successively delete characters, a Control U to delete back to the beginning of the line, a double control G to delete the entire command, and an altmode to terminate the command. Flow charting has been roughed out for the various command handling routines and many general purpose subroutines have been written. I'll keep at it, but it may take a while to finish. The command decoder will be character dispatch table driven so that one may easily add commands in the future or eliminate present ones to reduce memory requirements. As to memory, I'm aiming for a 4k program segment with text buffers, etc. filling out the remainder of available memory.

In writing this program, one which I hope every 8008 owner will desire, the problem of standards rears its ugly head. The following questions arise:

1) I/O will be kept to subroutines so these may be easily changed to fit individual systems. However, certain hardware requirements are a must. Namely a hardware push down stack. I started writing TEXTED without one, then decided that for the few $$ involved, it would be a lot easier and efficient to build one. Presently, I'm using The Computer Hobbyist's design modified to my I/O structure. But, what about other users? I've purposely avoided using my nice priority interrupt system since most users won't have one.

2) Mass storage is the big problem. TEXTED commands are planned to dump selected portions of the text buffer to cassette tape, to yank in text initially from tape, etc. I'm using the Sudding Tape Interface with a UART. However, I guess I'd better write software that does its own serial-parallel conversions to be in step with others. Also, I prefer a blocked data format on tape rather than an unformatted one. What do I do to keep every one happy? And, if I had a PHi Deck, as some others may, just imagine the additional commands I'd want to implement!

3) Once TEXTED is written and debugged, what is be best way to distribute it? Although my Sudding Tape Interface works beautifully with my system, it has not been possible for me to read the tape sent out by the Digital Group, perhaps due to timing and tuning differences. Won't the same be true for others if I try to distribute tapes?

4) The DEC System 10 monitor automatically generated a carriage return-line feed sequence (two characters) at the end of each TTY line. Should I write software under this assumption or meerly end each line with a carriage return (or be general)?

5) An so on and on. I'd be interested in receiving comments on conventions for TEXTED.

In the mean time, I'm enclosing several of the general purpose subroutines I've written for TEXTED and which may be of use to the group. All of these assume that a hardware pushdown stack is available (with a PUSH being the appropriate OUT instruction and a POP being the appropriate IN instruction). They can be written, of course, without one, but much of the convenience is lost. These have been thoroughly tested and should work well, by the way.

Enough for now! I'm looking forward to the next newsletter.

Sincerely,

Bill

```
;MULTIPLE PRECISION ADDITION ROUTINE - ADDS CONTENTS OF D,,E
;REGISTERS TO H,,L REGISTERS.  ENTER AT SADD FOR SINGLE PRECISION
;ADD TO H,,L.

SADD:  LDI Ø            ;CLEAR D FOR SINGLE PRECISION
DADD:  PUSH             ;SAVE A ON HARDWARE STACK
       LAL              ;ADD E TO L
       ADE
       LLA
       LAH              ;ADD D TO H WITH CARRY
       ACD
       LHA
       POP              ;RESTORE A FROM HARDWARE STACK
       RET              ;AND RETURN

;MULTIPLE PRECISION SUBTRACTION ROUTINE - SUBTRACTS CONTENTS OF D,,E
;REGISTERS FROM H,,L REGISTERS.  ENTER AT SSUB FOR SINGLE PRECISION
;SUBTRACT FROM H,,L.

SSUB:  LDI Ø
DSUB:  PUSH
       LAL              ;SUBTRACT E FROM L
       SUE
       LLA
       LAH              ;SUBTRACT D FROM H WITH BORROW
       SBD
       LHA
       POP
       RET

;ROUTINE TO EXCHANGE CONTENTS OF D,,E AND H,,L REGISTER PAIRS

EXCR:  PUSH
       LAL              ;EXCHANGE L AND E
       LLE
       LEA
       LAH              ;EXCHANGE H AND D
       LHD
       LDA
       POP
       RET

;ROUTINE TO INCREMENT H,,L REGISTER PAIR

INCHL: INL
       RFZ              ;NEED TO INCREMENT H TOO?
       INH
       RET
```

```
;ROUTINE TO DECREMENT H,,L REGISTER PAIR

DECHL: DCL
       INL
       JFZ DECHL1       ;ZERO SET IF L WAS ZERO
       DCH
DECHL1:DCL
       RET

;ROUTINE TO ROTATE CONTENTS OF D,,E REGISTER PAIR RIGHT INTO THE
;CARRY.  ENTER AT DRARCC TO INITIALLY CLEAR CARRY.

DRARCC:NDA              ;CLEAR CARRY
DRAR:  PUSH
       LAD              ;ROTATE D RIGHT INTO CARRY
       RAR
       LDA
       LAE              ;ROTATE E RIGHT INTO CARRY
       RAR
       LEA
       POP
       RET

;ROUTINE TO ROTATE CONTENTS OF D,,E REGISTER PAIR LEFT INTO THE
;CARRY.  ENTER AT DRALCC TO INITIALLY CLEAR CARRY.

DRALCC:NDA              ;CLEAR CARRY
DRAL:  PUSH
       LAE              ;ROTATE E LEFT INTO CARRY
       RAL
       LEA
       LAD              ;ROTATE D LEFT INTO CARRY
       RAL
       LDA
       POP
       RET

;ROUTINE TO COMPLEMENT (2'S) CONTENTS OF D,,E REGISTER PAIR.

DCOMP: PUSH
       XRA              ;CLEAR A
       SUE              ;SUBTRACT E FROM A=0
       LEA
       LAI Ø            ;CLEAR A (BUT DON'T DAMAGE BORROW!)
       SBD              ;SUBTRACT D FROM A=0 WITH BORROW
       LDA
       POP
       RET

;ROUTINE TO INCREMENT CONTENTS OF COUNTER IN MEMORY.  FIRST SET UP
;H,,L TO POINT TO COUNTER.  ON RETURN, C CONTAINS INCREMENTED COUNTER.

INCCNT:LCM
       INC
       LMC
       RET

;ROUTINE TO DECREMENT CONTENTS OF COUNTER IN MEMORY.  FIRST SET UP
;H,,L TO POINT TO COUNTER.  ON RETURN, C CONTAINS DECREMENTED COUNTER.

DECCNT:LCM
       DCC
       LMC
       RET
```

```
;MULTIPLE PRECISION UNSIGNED MULTIPLICATION ROUTINE - MULTIPLIES
;CONTENTS OF H,,L REGISTERS BY CONTENTS OF C REGISTER.  ON RETURN,
;H,,L CONTAIN DOUBLE PRECISION PRODUCT.  ALL OTHER REGISTERS INCLUDING
;C ARE UNAFFECTED AS IS THE CARRY FLAG. FALSE ZERO FLAG IF OVERFLOW,
;ELSE TRUE.

DMUL:   PUSH            ;SAVE A
        LAB             ;SAVE B
        PUSH
        LAD             ;SAVE D
        PUSH
        LAE             ;SAVE E
        PUSH
        LBI ↑D9         ;COUNT 9 (DECIMAL) BITS
        LAI Ø           ;CLEAR A BUT WATCH CARRY
        LDH             ;TRANSFER H,,L MULTIPLICAND TO WORKING REGS
        LEL
        LHA             ;CLEAR H,,L PRODUCT REGISTERS
        LLA
DMUL1:  LAC             ;ROTATE A BIT OF MULTIPLIER INTO CARRY
        RAR
        LCA
        DCB             ;DECREMENT BIT COUNTER
        JTZ DMUL3       ;DONE?
        CTC DADD        ;IF LSB OF MULTIPLIER WAS 1, THEN H,,L=D,,E+H,,L
        JTC DMUL2       ;OVERFLOW?
        CAL DRALCC      ;SCALE MULTIPLICAND IN D,,E
        JMP DMUL1       ;AND CONTINUE
DMUL2:  LAC             ;PATCH UP C REGISTER AND CARRY IF OVERFLOW
        RAR
        LCA
        DCB
        JFZ DMUL2
        INB             ;SET ZERO FLAG FALSE TO NOTE OVERFLOW
DMUL3:  POP             ;RESTORE E
        LEA
        POP             ;RESTORE D
        LDA
        POP             ;RESTORE B
        LBA
        POP             ;RESTORE A
        RET             ;RETURN (FINALLY!!!)

;MULTIPLE PRECISION UNSIGNED INTEGER DIVISION ROUTINE - DIVIDES
;CONTENTS OF H,,L REGISTERS BY CONTENTS OF C REGISTER.  ON RETURN,
;H,,L CONTAIN DOUBLE PRECISION QUOTIENT AND E THE SINGLE PRECISION
;REMAINDER.  ALL OTHER REGISTERS INCLUDING C ARE UNAFFECTED AS IS
;THE CARRY FLAG.  DON'T TRY TO DIVIDE BY ZERO!

DDIV:   PUSH            ;SAVE A
        LAB             ;SAVE B
        PUSH
        LAD             ;SAVE D
        PUSH
        LBI ↑D17        ;COUNT 17 (DECIMAL) BITS
        LAI Ø           ;CLEAR A BUT WATCH CARRY
DDIV1:  LEA
DDIV2:  CAL EXCR        ;ROTATE DIVIDEND-QUOTIENT REGISTERS LEFT
        CAL DRAL        ;INTO THE CARRY
        CAL EXCR
        DCB             ;DECREMENT BIT COUNTER
        JTZ DDIV3       ;DONE?
        LAE             ;ROTATE WORKING DIVIDEND EXTENSION REG. LEFT
        RAL
        LEA
```

```
        SUC             ;TRY TO SUBTRACT DIVISOR
        RAL             ;ROTATE CARRY INTO BIT 0
        XRI 1           ;COMPLEMENT IT
        RAR             ;AND ROTATE IT BACK INTO CARRY
        JTC DDIV1       ;SUBTRACTION OK-KEEP RESULT
        JMP DDIV2       ;SUBTRACTED TOO MUCH-DO NOT KEEP RESULT
DDIV3:  POP             ;RESTORE D
        LDA
        POP             ;RESTORE B
        LBA
        POP             ;RESTORE A
        RET             ;RETURN (SEE HOW EASY DIVISION CAN BE!)

;RADIX PRINT ROUTINES - ENTER AT OCTOUT TO PRINT CONTENTS OF H,,L
;REGISTERS AS AN OCTAL INTEGER OR AT DECOUT TO PRINT AS DECIMAL
;INTEGER (BOTH UNSIGNED).  ON RETURN REGISTERS A-E ARE UNAFFECTED,
;H,,L CONTAIN ZERO.

OCTOUT:PUSH             ;SAVE A
        LAC             ;SAVE C
        PUSH
        LCI ↑D8         ;LOAD RADIX 8 (DECIMAL)
        JMP OUT
DECOUT:PUSH             ;SAVE A
        LAC             ;SAVE C
        PUSH
        LCI ↑D10        ;LOAD RADIX 10 (DECIMAL)
OUT:    LAE             ;SAVE E
        PUSH
        LAI -1          ;MARK BASE OF STACK
        PUSH
OUT1:   CAL DDIV        ;DIVIDE SUCCESSIVELY BY RADIX
        LAE             ;PUSH REMAINDER ONTO STACK
        PUSH
        CAL TSTØ        ;ARE H,,L ZERO?
        JFZ OUT1        ;NOPE-SO CONTINUE
OUT2:   POP             ;POP A REMAINDER FROM STACK
        CPI -1          ;AT BOTTOM OF STACK?
        JTZ OUT3        ;YES-CLEAN UP AND WE'LL BE DONE
        CAL DIGOUT      ;NO-PRINT THE DIGIT (USER DEFINED ROUTINE)
        JMP OUT2        ;AND GO BACK FOR MORE
OUT3:   POP             ;RESTORE E
        LEA
        POP             ;RESTORE C
        LCA
        POP             ;RESTORE A
        RET             ;RETURN FROM THIS MADNESS

TSTØ:   XRA             ;CLEAR A
        CPH             ;H=0?
        RFZ             ;NOPE DON'T BOTHER WITH L
        CPL             ;L=0?
        RET

;ROUTINE TO CLEAR CONTENTS OF MEMORY BLOCK FROM (H,,L) UP TO BUT
;NOT INCLUDING (D,,E).  ON RETURN, H=D AND L=E.  OTHER REGISTERS
;ARE UNAFFECTED.

CLRMEM:PUSH             ;SAVE A
CLRM1:  LAH             ;TEST H-D
        CPD
        JTC CLRM2       ;TRUE CARRY IF D H
        LAL             ;TEST L-E
        CPE
```

```
        JFC CLRM3       ;CARRY FALSE IF E L
CLRM2:  XRA             ;CLEAR A
        LMA             ;LOAD MEMORY WITH ZERO
        CAL INCHL       ;ADVANCE ADDRESS
        JMP CLRM1       ;AND DO IT AGAIN

CLRM3:  POP             ;RESTORE A
        RET             ;THAT'S ALL FOLKS

;ROUTINE TO RETRIEVE A BYTE FROM THE MEMORY LOCATION SPECIFIED BY
;THE TWO WORD (HIGH ADR 1ST-LOW ADR 2ND) POINTER CONTAINED IN
;MEMORY AND REFERENCED BY H,,L REGISTER PAIR.  ON RETURN, A CONTAINS
;THE BYTE, D,,E PAIR POINT TO THAT BYTE IN MEMORY, AND H,,L PAIR
;ARE UNAFFECTED.

LDB:    CAL PNTGET      ;FETCH POINTER TO H AND L
        LAM             ;RETRIEVE THE BYTE
        JMP PNTPT1      ;FIX UP ADDRESS REGISTERS AND RETURN

;ROUTINE TO DEPOSIT BYTE IN A INTO THE MEMORY LOCATION SPECIFIED BY
;THE TWO WORD POINTER CONTAINED IN MEMORY AND REFERENCED BY H,,L
;REGISTER PAIR.  ON RETURN, A IS UNAFFECTED, D,,E PAIR POINT TO
;THAT BYTE IN MEMORY, AND H,,L PAIR ARE UNAFFECTED.

DPB:    CAL PNTGET
        LMA             ;DEPOSIT THE BYTE
        JMP PNTPT1

;ROUTINE TO INCREMENT THE TWO WORD POINTER CONTAINED IN MEMORY AND
;REFERENCED BY H,,L REGISTER PAIR. ON RETURN, D,,E PAIR CONTAIN
;THE INCREMENTED POINTER, AND H,,L PAIR ARE UNAFFECTED.

IBP:    CAL PNTGET
        CAL INCHL       ;INCREMENT THE POINTER
        JMP PNTPT1

;ROUTINE TO FIRST INCREMENT THE TWO WORD POINTER CONTAINED IN
;MEMORY AND REFERENCED BY H,,L REGISTER PAIR THEN RETRIEVE A BYTE
;FROM THE MEMORY LOCATION SPECIFIED BY THE INCREMENTED POINTER. ON
;RETURN, A CONTAINS THE BYTE, D,,E PAIR POINT TO THAT BYTE IN MEMORY,
;AND H,,L PAIR ARE UNAFFECTED.

ILDB:   CAL PNTGET      ;FETCH POINTER TO H AND L
        CAL INCHL       ;INCREMENT THE POINTER (NOTE INCREMENTS FIRST)
        LAM             ;RETRIEVE THE BYTE
        JMP PNTPT1      ;FIX UP ADDRESS REGISTERS AND RETURN

;ROUTINE TO FIRST INCREMENT THE TWO WORD POINTER CONTAINED IN
;MEMORY AND REFERENCED BY H,,L REGISTER PAIR THEN DEPOSIT BYTE IN
;A INTO THE MEMORY LOCATION SPECIFIED BY THE INCREMENTED POINTER.
;ON RETURN, A IS UNAFFECTED, D,,E PAIR POINT TO THAT BYTE IN MEMORY,
;AND H,,L PAIR ARE UNAFFECTED.

IDPB:   CAL PNTGET
        CAL INCHL
        LMA
        JMP PNTPT1
```

```
;ROUTINE TO FETCH THE TWO WORD POINTER REFERENCED BY H,,L REGISTER
;PAIR.  ON RETURN, H,,L CONTAIN THE POINTER AND D,,E PAIR REFERENCE
;THE LOW (2ND) WORD OF THE POINTER.

PNTGET:LDM              ;GET HIGH WORD OF POINTER
       CAL INCHL        ;GET LOW WORD OF POINTER
       LEM
       JMP EXCR         ;EXCHANGE CONTENTS OF D,,E AND H,,L REGISTER
                        ;PAIRS AND RETURN

;ROUTINE TO PLACE A TWO WORD POINTER CONTAINED IN H,,L REGISTER
;PAIR INTO THE TWO MEMORY LOCATIONS, THE SECOND OF WHICH IS
;REFERENCED BY D,,E REGISTER PAIR. ENTER AT PNTPUT IF H,,L AND
;D,,E PAIRS ARE REVERSED.  ON RETURN, D,,E PAIR CONTAINS THE POINTER
;AND H,,L PAIR REFERENCES THE FIRST WORD OF THE TWO WORD POINTER.

PNTPT1:CAL EXCR         ;EXCHANGE D,,E AND H,,L REGISTER PAIRS
PNTPUT:LME              ;STORE HIGH WORD OF POINTER
       CAL DECHL        ;STORE LOW WORD OF POINTER
       LMD
       RET

;ROUTINE TO SET SPECIFIED BITS OF A FLAG WORD IN MEMORY REFERENCED
;BY H,,L REGISTER PAIR.  ON RETURN, ZERO IS TRUE IF SPECIFIED BITS
;WERE ALREADY SET. REGISTER A CONTAINS THE NEW FLAG WORD.

;CALLING SEQUENCE:
;      LHI H(FLAG)       ---SET UP REFERENCE TO FLAG WORD
;      LLI L(FLAG)
;      LAI MASK          ---MASK CONTAINS 1's IN SPECIFIED BITS
;      CAL SETFLG

SETFLG:ORM              ;INCLUSIVE OR MASK AND FLAG WORD
       CPM              ;COMPARE WITH OLD FLAG WORD
       LMA              ;STORE NEW FLAG WORD
       RET

;ROUTINE TO CLEAR SPECIFIED BITS OF A FLAG WORD IN MEMORY REFERENCED
;BY H,,L REGISTER PAIR.  ON RETURN, ZERO IS TRUE IF SPECIFIED BITS
;WERE ALREADY CLEAR.  SEE SETFLG FOR SIMILAR CALLING SEQUENCE.

CLRFLG:XRI 377          ;COMPLEMENT MASK
       NDM              ;AND MASK AND FLAG WORD
       CPM              ;COMPARE WITH OLD FLAG WORD
       LMA              ;STORE NEW FLAG WORD
       RET
```

M. Douglas Callihan, Berkley St. RFD #1, Berkley, MA says that he is just about ready to buy the ALTAIR 8800 as he is particularly interested in uses of the 8080. He has a pair of Phi-decks and his ideas on utilizing them were included in one of the last newsletters. His hope is for a cassette data standard so that software can be exchanged with some degree of compatibility. He is interested in hearing from anybody in South Eastern Mass. who has a system up and running.

Mark Crook, 3 Bel Aire Road, Delmont, Pa 15626 ordered a Mark-8 because it has the bugs worked out and a lot of software is available. He intends to use the Suding modifications. Mark's reason for building a computer include curiosity, and applications such as automating his checkbook and income tax, and a little mutual fund analysis. He would like to teach the beast to inventory groceries and print out a shopping list with the theory that if he can save his wife some time, she'll be more enthusiastic. He thinks that a lot of work should be in this direction.

Michael Christoffer, 4139 12th NE #400, Seattle, WA 98105 says that he received a letter from Bob Albrecht at PCC and only two people has shown any interest in the "build your own BASIC" article (volume 3, #4, PCC Newspaper). The project has apparently been dropped due to lack of interest. This lack of interest should not be tolerated. The ability to develop a high level language with less than 4k of memory is a necessity for the unsupported avocational microcomputer builders if their wives and children are expected to become users. It is understandable that many are having hardware and peripheral problems at the present time. However, high level language development for limited memory systems must be the next order of business. Everyone interested in this near dead project should forward a letter indicating so to PCC. This is of importance to the future of 8008 users!!!!!

REVIEW . . .

THE SCIENTIFIC CALCULATOR INTERFACE

by "Tex" Ritter

Imagine! It finally arrived! The Mini Micro Mart scientific calculator interface kit. Never mind that the thing costs $69.95. Never mind that it took five weeks to fill the order. Bet you can hardly wait 'till I open 'er up . . . Well, SURPRISE, because it's a replay of the Mark-8 boards.

Details? Sure -- just like the Mark-8, the calculator interface board is double-sided, but not plated-through. And just like the Mark-8, IC connections are sometimes made from the top, sometimes from the bottom of the board. This means that any plastic-cased socket you use must be raised above the board to allow soldering to both top-side and bottom-side connections. Further, the IC pads were cleverly laid out with small runs between each pad, so plain Molex pins can't be used either.

Yes, some IC devices really do go bad during operation. And if the IC's are not in sockets, the system can't be checked by substitution. Now, to avoid destroying the board, you chop all the leads off of the IC body, so they can be removed from the board one-by-one; now the IC can't be checked.

This problem was one of the main difficulties in working on the Mark-8, and should have been left behind by now. Since Space Circuits seems to make a profit on similar-sized plated-through boards @ $13 (plus postage and handling) it's a shame this wasn't. I finally soldered in Molex pins (with nests) and duplicated all top-of-the-board connections on the bottom with individual wires -- what a hassle.

The Mini Micro Mart literature indicates that the $69.95 price should include software. Twelve weeks after this order, I have yet to receive this software. Perhaps more amusing is the letter received with the kit. Among other things, they found that under-rated components might have been substituted for two of the resistors (sure enough, they were!), and the lucky kit owner is simply supposed to request replacements. In this way, the cost of checking the individual kits was placed on the consumer.

The kit included no instructions, but only a component layout, which was probably sufficient. One 2k resistor was missing, but I had a replacement. Unfortunately, the board was cut inaccurately, so that it may be improperly inserted into an edge-connector such that adjacent pins are shorted.

I have yet to run the thing -- it may even work.

TEX'S TOPICS

by Terry F. Ritter
2524B Glen Springs Way
Austin, TX 78741

8008 BASIC -- Well, almost . . .

With assistance from Edward Byrne (Naperville, Illinois) we seem to have cracked "The Case of the Two BASICs." It seems that the National Technical Information Service (NTIS, U.S. Dept. of Commerce, 5285 Port Royal Rd., Springfield, VA 22151) document PB-235 874 "A Basic Language Interpreter for the Intel 8008 Microprocessor," by Weaver, Tindell, and Danielson @ $3.75 is exactly the IEEE report R75-20 @ $5.20. Neither, of course, include any listings, and so make rather dull reading by themselves, but are great guides to the actual system.

This system was apparently developed on an IBM 360 (using an 8008 simulator program) as part of a seminar course on minicomputers, and has probably not been implemented on an actual 8008. In particular, the (copyrighted) Datapoint 2200 Floating Point Package and transcendentals were used, but not listed (this package may require a hardware stack for PUSH/POP instructions as in the Datapoint). Alternately, the Scientific Calculator interface might be used if the floating-point format internal to the BASIC is modified. As written, the system uses 16k of memory -- it's my feeling that the system is just not very efficient, but Ed points out that it may be possible to partition the program into overlays that could be brought in from tape as needed.

I have about 72 pages of (assembler) source code, and 40 pages of simulation tests (with one error). I don't think many of you will want to play with this thing, but it is now availiable, and a suitable distribution mode can be worked out. In particular, you might send a BIG, heavy-duty self-addressed envelope, about a dollar in stamps (I'll go so far as to put on what it needs), a twenty-dollar check for guarantee of safe return, and you get to keep the package for a week. If you return it, you get your check back. If not, of course, I'll get very angry. Alternately, Hal may want to supervise distribution.

Speaking of Tape . . .

There has certainly been a lot of bruhaha (try THAT quickly three times) in the last six months or so about tape storage of data. First came the FSK systems, of which the 375 baud Suding system is now dominant (The Digital Group's software strategies serve to enforce this standard). The Computer Hobbyiest has a fairly nice pulse system that is much less-dependent upon tape speed-accuracy, but is still limited to about 500 baud, max. But there has been very little notice of the Don Tarbell system, which stores bi-phase data at 1.5k baud. (I got his info package for $2.50 12/15/74: Don Tarbell, 144 Miraleste Dr., Apt. 106, Miraleste, CA 90732).

The slower storage systems rely on software for parallel to serial to parallel conversions, but if the 8008 is not fast enough for the Tarbell system, hardware may be necessary. On the other hand, the 8080 is probably fast enough to simplify the interface, and faster tape systems are coming . . .

Put ROM In High-Memory!

When I first developed my ROM Mini-Executive, I decided to place it just above my 1k memory, i.e., starting at 04 000. Now that I've decided to add more memory, the obvious question is "Where do I put it?" If the new memory is placed after the ROM segment, RAM will be broken into two seperate blocks, which is very undesirable (especially when loading programs from tape). In any other case, the ROM must be re-addressed and re-programmed. Since most software-on-tape is designed to load into low memory (using the RESTART locations), this area should be RAM. Save yourself my problem -- put your ROM's and library routines in high memory. Now RAM can be contiguously enlarged until it encroaches on the ROM library.

The Modular Computer

The computer hobby is going to be around awhile, and lots of experimenters and small companies are going to be improving and expanding small systems. Consequently, a manufacturer could gain a good reputation in this hobby, and a whole industry, by introducing a complete modular system of PC boards and support designs for the small-computer user. The Modular Computer is something like this:

The Modular Computer should be composed of circuit boards in a solid, easily-expandable card-cage. Each card should be sold drilled and plated-thru, availiable populated or bare, and include a card-puller lever for easy extraction. Each card in the modular computer should contain one complete logical system, and should not need signals from other cards (other than the CPU) in order to operate. The backplane should be fully parallel, so that each card slot could accomodate any card (this would facilitate board-testing via a cable-extended socket).

Connections to external devices (data I/O, interrupts, etc.), could be made on the boards proper via DIP plugs; the wires could then be brought out the front of the card cage between the cards. In this way it should be possible to place eight input or output ports on one card, maximizing the use of board real-estate, while eliminating backplane pin-limitations.

I/O and memory boards should be designed with DIP-switch selectable addressing on each card; this would facilitate installation and substitution (in case of trouble). Every attempt should be made to make ROM essentially interchangable with RAM to facilitate the development of programs in RAM, and their transfer to EROM for use.

Each peripheral device on a card would be designed to function wholly on that card; any needed input or output ports would be included (with selection circuitry) on that board.

A front panel is generally used to gain control of the CPU for system hardware tests. A full-scale unit could be implemented, extended by cable, and simply plugged into the bus like any other card; alternately a mini unit could be designed on one card-edge alone. The system must allow the bus to be extended three feet or so (via line-drivers, buffers, or equipment as necessary) to allow table-top troubleshooting of any card (including the CPU). The basic system should allow the use of any known 8-bit chip by simply plugging in a different CPU board.

Brion Johnson, 1423 Alta Vista Road, Santa Barbara. CA 93103

Using a 555 as a touch switch.

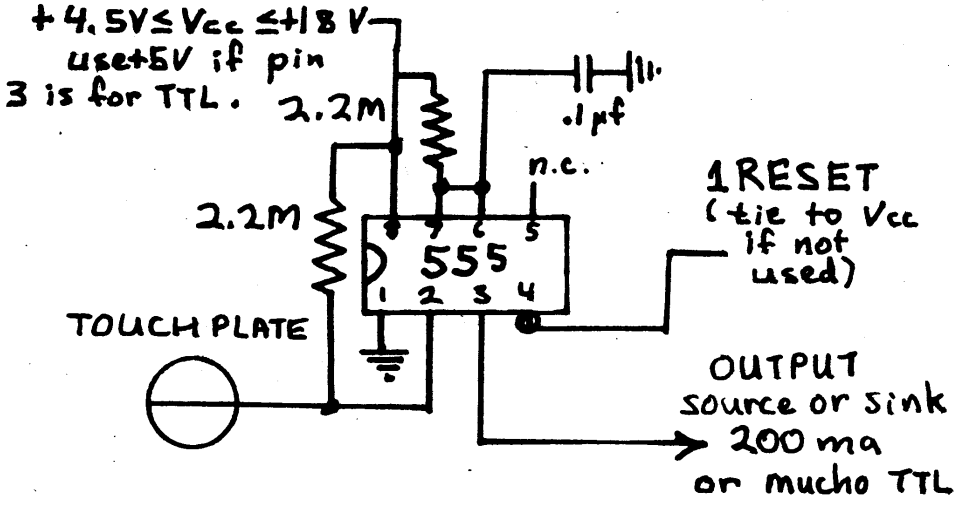
Using the hookup shown below, the handy 555 timer/oscillator becomes a touch switch, with input from a human on one side, and output compatible with TTL on the other. The 555 is used in its monostable mode with the timeout being about a second, depending of course on the tolerance of R2 and C1. When a human finger touches the touch plate, the trigger pin of the 555 (pin 2) picks up the induced 60HZ field from the building's AC line wiring. Although the current of this AC is very low, it is sufficient to trigger the high impedance input of the 555. The monostable delay of 1 second is sufficient to debounce the input and presents a beautiful fast-risetime pulse at pin 3 which is capable of sinking or sourcing 200 milliamps and is TTL compatible. To make a momentary action switch use pin 3 directly. To make an alternate action (touch on, touch off) switch, run pin 3 to the clock input of a j-k flipflop which has both J and K inputs high, and the flipflop will toggle everytime the touch plate is touched.

In addition, if the touch plate is touched and held, the 555 will oscillate at a frequency near its timeout rate. This is useful for such operations as examining memory, etc. Note that the circuit in this mode is not completely reliable, Ocassionally double or trible pulses may get thru as the 555 is not guaranteed for a 100% duty cycle.

Layout is not too critical, although the RC circuit is a little sensitive to noise. Make the touch plate leads as short as possible. A piece of aluminum screen makes a beautiful touch plate.

I have used this circuit for all of the front panel controls for MINAC II (see newsletter #7) and am quite pleased with the speed and smoothness of operation.

(I have seen and used this setup and it is great. You'll just have to breadboard the circuit. You'll think of a million uses for it once you see it work. Hal)



A. J. Keck, 250 Carriage Road, Winnipeg, Manitoba, Canada R2Y 0M2 888-8409 has an ALTAIR 8800.

C. A. Southard, WAØIOT, 2519 Meadowbrook Drive SE, Cedar Rapids, Iowa 52403 has a 4K SCELBI system running now.

James H. Edwards, 6631 Wakefield Drive, Apt. 209, Alexandria, VA 22307 built the ALTAIR kit but dosen't have it debugged as yet. He plans to use it with a TVT-1 and a surplus keyboard with potential future projects including games and music synthesis. He wants to get the BASIC but just can't see paying the MITS prices for memory and I/O just to get the software they offer. Any other suggestions?

Joel Granick, 922 Eden Avenue, Highland Park, NJ 08904 has purchased an ALTAIR 8800 but is disturbed by the outragious price of MITS peripherals. His immediate needs are to obtain more memory, construct an I/O device (probably a TV terminal), and obtain a software system. He wants to know if anyone is in the process of putting software for 8080 systems on mask programmed ROM's?

Alan Smith, RR #1, DeGraff, MN 56233 purchased the Scelbi-8H unpopulated PC boards and obtained parts and assembled it. He designed and built an octal keyboard and a TVT and is now in the process of debugging a Modem using wire wrap. He says the Texas Instrument Microprocessor TV series was a good introduction to microprocessors but the $25 book is not worth that much now.

P. Reece, PO Box 939, Waterdown, Ontario, Canada LOR 2Ho is interested in PDP-8 cross assemblers and simulators for 8008's. They have 15 PDP-8's (s, I, & E), a CDC-6400, an HP-3000, & three HP-2100's where he works. The DEC machines are used exclusively for real time work in physiology and psychology. He is currently building an 8008 machine in an attempt to prove to the people he works with that computing power in real time can be augmented greatly with intelligent half-way processors which are inexpensive, albeit slow.

James I. Garrett, Jr., 9523 LBJ Freeway, Apt. 204, Dallas, TX 75231 is interested in the ALTAIR 8800 and attended the MITS demonstration. This is his report: "The only thing that impressed me was the CPU. They <u>did not</u> have the disk, high speed printer, etc. up. However I do like it designwise. I'm a scientific programmer in geophysical research (high level languages only). The ALTAIR BASIC is SUPER!! I learned BASIC 4 years ago so I sat down at their terminal and whipped out a plotting routine and factorial program in about 10 minutes." He says that he would like to apply a microcomputer to a solar heated and cooled house along with a timesharing system for accounting, games, etc. He has some experience in electronics but is mostly interested in software. James is a physics major from Georgia State University in Atlanta and has access to a WATS line after 7 PM so can communicate with others rather inexpensively.

Chase Bockman, 4805 NE 52, Portland, Oregon 97218 is researching the concept of digitally controlling a sound reinforcement system thru the use of surplus 8008 microprocessors and associated chips. The system should be capable of transmitting 16 channels of multiplexed information from a remote analog to digital converter with memory to a microphone mixing console with voltage controlled gain blocks. His profession is sound reinforcement and he only has a limited knowledge of digital processes and applications. Chase would be gratefull for any assistance participants might offer in the form of practical circuit applications using surplus components.

THE "SPHERE SYSTEM PHILOSOPHY"

SPHERE Corp., 96 E. 500 So., Bountiful, Utah 84010

The SPHERE 1 computer system was designed to provide an uncompromising computer system at minimal cost.

The keyword to our design is the word "SYSTEM". Every phase of the design has been influenced by the "SYSTEM" philosophy. To justify the system title, a "COMPUTER" must perform an application acceptably. Recently the cost of peripherals and software have substantially exceeded the cost of the computer, but without them, a computer can not perform much of anything acceptably.

With the onset of the micro-processor, real design innovations have been possible, but without the system philosophy, a micro-processor can only reduce the processor cost. Peripherals, memory, and software continue to be expensive.

The SPHERE 1 computer is uniquely cost effective because it utilizes real design innovations to reduce the amount of circuitry required throughout the system. The SPHERE add-on memory board will support 4, 8, 12, or 16K of dynamic random access memory (instead of four 4K memory boards and a mother board). Our power supply has been placed in a separate chassis to eliminate a common source of heat. This allows the system to run cooler and eliminates the need for an expensive fan. The system uses a standard TV for a 512 character display. The use of the TV and other common components has reduced the cost and allowed more machine versatility. Further cost reductions have been achieved by replacing the front console (lights and switches) with the TV terminal and a program in Read Only Memory (ROM) that performs the same function, only better. The CPU card is packaged to provide all of the basic funtions required by a useful system, thereby eliminating unnecessary extra PC BOARDS.

In order to insure a full offering of high quality peripherals from the onset, we have selected manufacturers who already have peripherals which interface to our product. This philosophy has allowed us, in the case of our disk, to select already running software (namely a disk operating system) which we may offer to our users immediately. Other peripherals that are available with our system include a low cost line printer and a paper tape reader/perforator. These devices are interfaced to the system via a single interface module which also serves as a programmable digital Input/Output port. The SPHERE system also supports its own set of terminals, the lowest cost terminals available today.

The Program Development System (PDS) includes an EDITOR, and MINI ASSEMBLER, and a debugging package. It also includes CRT display and audio cassette software drivers, plus a cassette loader and dumper. Although most computer processing occurs at the character (8 BIT) level, it is sometimes desireable to use 16 bit arithmetic so we have provided an extended 16 bit instruction set in the PDS system. This package rounds out the "SYSTEM" concept for our smallest systems.

There are proponents of various computer languages everywhere. Each language is suited more or less to a specific group of applications. Although the advent of the micro-processor really dictates some new philosophies in computing language, the BASIC language seems to come closest to this philosophy. Because of its widespread use we have selected it to be our first computer language.

The FLOPPY DISK OPERATING SYSTEM (FDOS) is supplied on all systems purchased with a disk unit. FDOS is an extended PROGRAM DEVELOPMENT SYSTEM. It provides for named files, an extended editor, a full assembler, and debugging system. This system includes a comprehensive 300 page programming manual.

The software supplied to make the Sphere System a useful "SYSTEM" is attractive; however, the real contribution that SPHERE offers is one of commitment. The SPHERE "SYSTEM" concept demonstrates only the surface of the real technological advances that are possible when true design innovation is combined with foresight and state-of-the-art technology. The SPHERE "SYSTEM" concept is the commitment. Watch and see.

THE ONE CARD COMPUTER

The logical approach to the solution of any problem is to determine the minimum requirement for a satisfactory result. In the case of a small computer, an absolute minimum would include a reasonable amount of memory, a capable CPU, Input/Output capability, a real-time clock, read only memory program which if used in conjunction with a terminal can replace the computer's switch panel and display lights, and finally it ought to have a convenient Bus structure to easily attach other modules.

The SPHERE ONE CARD COMPUTER includes all of the above features plus a few that also deserve attention. Below each of the principal features are listed:

1) The CPU — The MOTOROLA 6800 microprocessor is the most advanced microprocessor available today. It reduces the necessity for support components and includes features not found on computers of many times the size. The IBM 370 for example will not store all of its registers automatically upon receipt of an interrupt as the 6800 will. The 6800 system resembles the architecture of the Digital PDP-11 in many ways. These include instructions that "PUSH" data onto a STACK temporarily and when temporary storage is no longer required the data may be "POPed" off of the stack. The 6800 doesn't have as many registers as the 8080; however the 6800 has several addressing modes which in most cases completely outweigh its lack of registers. These modes are particularly advantageous when tables are processed. However, when three or four counters are being incremented or decremented the 8080 is faster, but in either case the 6800 is easier to program.

2) Memory — This system uses the 2107A type 4K by 1 dynamic random access memory. This memory was used because it is the least expensive memory available and would lower the cost of the system. All refresh circuitry for the system is included on the CPU board.

3) I/O — If this board is used in a stand alone situation a CPU must communicate to the outside world. Therefore, the system is supplied with 16 programable I/O lines as an option. Four additional lines which may be used as programed interrupts are also supplied on the board.

4) Real-time clock — A stand alone process control system and many other systems require the capability of monitoring the progress of an activity. The SPHERE system has a real-time clock which will interrupt the system at a set interval. This interval is a function of the refresh clock which is set at 1 ms. The interrupt may occur at 1x, 2x, 4x, 8x, or 16x the refresh rate. The interval may also be set externally. The rate is determined by a wire strap.

5) EPROM — The Erasable Programmable Read Only Memory used by the system is the 1702 A. Programers for this EPROM are commonly available so that users may find programing the system for a stand alone application a reasonable task. When delivered with a SPHERE system the EPROM contains a Program Development System (PDS) which is described under "SOFTWARE".

6) BUS structure — The BUS is driven by tri-state TTL buffers which are capable of driving 35 standard TTL devices. The BUS is connected to this board via three 14 pin dual-in-line connectors which will transmit and receive information over 3 14 conductor flat ribbon cables. Eight data, 16 address, BUS and control lines are transmitted bidirectionally to and from the CPU, memory, and perephials. I/O devices, buffer, and status registers are addressed as memory locations at the top (HIGH ORDER LOCATIONS) of memory in much the same as the digital PDP-11. This means that about 35,000 devices could be attached to the system (theoretically). It also means that any machine instruction may operate on device buffer and status registers as they would to memory.

This limits the maximum memory on SPHERE systems to 56K instead of the theoretical 64K because the high order 8K is reserved for device status and buffer registers.

7) Power-on reset — When power is applied to this board, circuitry forces a reset to the processor until the system power has had time to stabilize. The system will immediately thereafter jump to a specific location in the read only memory (EPROM) to begin meaningful processing.

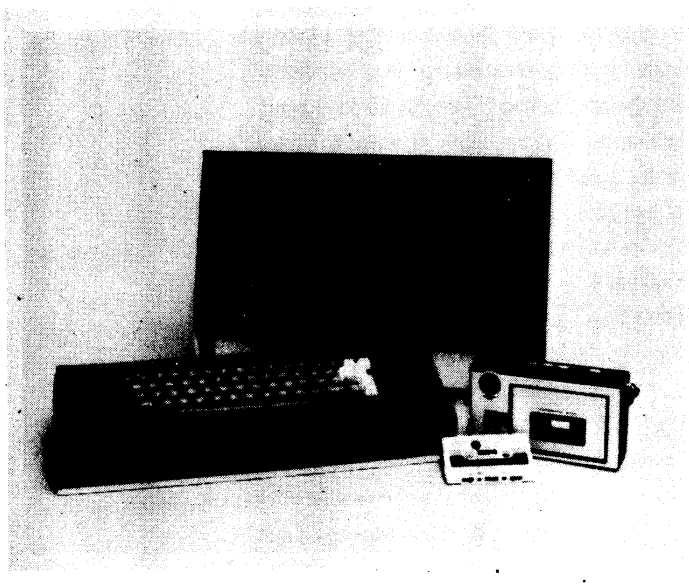
Program Development System

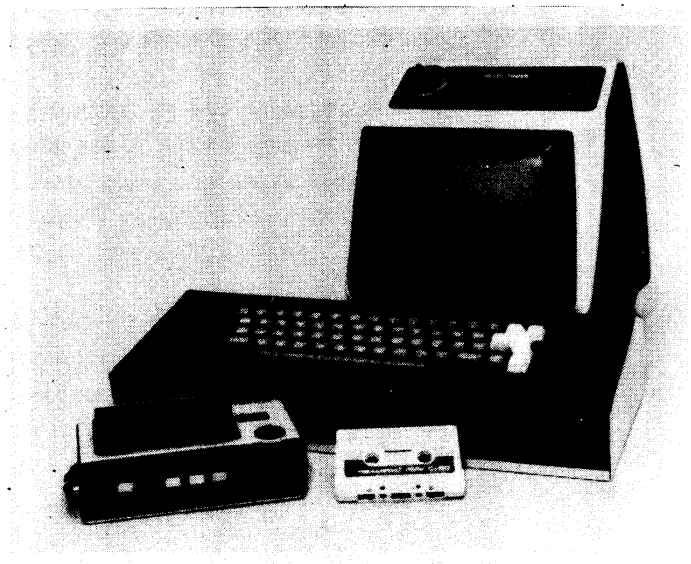
PDS represents a unique approach to the software of a low cost computer system. By the addition of software routines located in a 1K PROM even the smallest system is capable of doing useful work as well as performing all of the functions of a switch panel and display lights. The software, consisting of a debugger, assembler, editor, 16 bit arithmetic, and ASCII conversion routines, allows for development of user software in much the same way as large disk based systems.

The SPHERE Debugging Aid (SDA) is designed to aid in program development, as well as replace the usual switch panel and display lights function. It allows the user to easily view and alter the contents of memory or CPU registers from the keyboard-CRT display.

The Mini-Assembler allows the user the ability to input source assembly language programs and output unrelocatable binary object code. It can handle up to 62 symbolic addresses, different operand sizes and octal, decimal and hexadecimal operands. The operation codes are entered in hexadecimal (i.e. ADDA immediate is "8B").

Included is an expanded instruction set (EIS) for working with 16 bit operands in any one of several pseudo 16 bit registers or from memory or immediate operands. The EIS contains instructions to subtract, add, multiply, divide, move, compare and shift 16 bit operators as well as instructions to perform BINARY-ASCII conversion. It also includes instructions to perform I-O from the CRT-keyboard or the audio cassette or modem. The input-from-keyboard instruction includes a built in CRT based editor allowing scrolling and text insertion and deletion based on a cursor, allowing easy text manipulation.





SPHERE SYSTEMS

SYS1/KIT HOBBIEST ($650)

This computer system is capable of satisfying the needs of the user who wishes to program, develop, and debug programs for light process control, experimenting, and some educational purposes. As with all SPHERE "SYSTEMS", the computer was designed to perform a useful function. It was not intended to be a useless computer with a lot of money spent on front console.

All SPHERE systems are shipped with software and a commitment that software developed in the future by SPHERE or one of its users will be available at minimal cost. The PDS SYSTEM is included in the read only memory of this system. It and other software which is available is described under the heading "SOFTWARE".

Expandability has been considered from the onset. Some of these considerations include additional memory to 64K, inter-computer communications, a full line of peripherals, home and industry utility, and lowering cost while increasing performance in the future. Below are listed the modules contained in the system:

1) CPU1 — This module contains all of the features listed under "THE ONE CARD COMPUTER".

2) KBD1 — This module includes a standard typewriter style alph-numeric keyboard layout with an adding machine style numeric keypad located to the right. Above the numeric keypad is a star shaped cursor control keypad which includes HOME and ERASE functions. The keyboard module also includes 2-key rollover (single key read until released, regardless of other keys pressed), complete interface from keyboard to CPU bus with additional interfacing to the bus for 10 general purpose digital I/O lines which may be used at the user's discretion. This module includes an attractive keyboard chassis. This chassis houses the keyboard and all of the modules in this system plus 3 slots for future expansion. A maxium of seven additional KBD1 modules may be added later.

3) CRT1 — This module contains the necessary electronics to display 512 characters on a television or video monitor. The 64 character ASC11 character set is displayed in a matrix of 32 characters by 16 lines. Each character is displayed in a matrix of dots, 5 dots wide and 7 dots high. To display a character a computer program simply moves the desired character into a memory position which is also the display refresh buffer. The refresh buffer is located in the high-order 8K of memory. It consists of 512 bytes of static RAM that is organized to be accessed by the CPU and CRT simultaneously without degrading the access time to either CPU or CRT (dual port memory). Output from this module to the video monitor appears as a composite video signal or separate horizontal, vertical, and video signals. Etches for RF modulator (adjustable from channels 1-3) have been left on the PC board, and schematics have been provided; however, components have not been supplied because this type of circuit requires FCC testing and approval. Instructions for TV modification are included with purchase.

4) PWR1 The power supply has been designed expressly for the SPHERE 1 system. It produces 5 volts at 5 amps, 12 volts at 3 amps, -5 volts at 400mA, and -12 volts at 400mA. Ratings may be improved with the addition of capacitors. The circuits are highly under rated which should allow the system to run cooler. The power supply includes zener over voltage and reverse voltage protection. All supplies are current-limited, however over current-protection for the 5 volt supply may allow a power transistor ($1.50) to burn out. The 12 volt supply also allows this to happen. This occurs because of a cost trade-off ($40.00 to protect $3.00 in transistors) vs performance (will probably never occur). The power supply is contained in a separate chassis which includes a 3 prong wall plug, power cord, cable to the rest of system, and a fuse to protect the system.

5) BCB1 Each of the system modules is connected via a system bus. The bus consists of 3 flat ribbon cables containing 14 conductors each. Every other conductor is grounded to eliminate cross talk (electrical noise). Each cable is connected to each board via a 14 pin dual-in-line (DIP) connector. Each board has 3 standard 14 pin IC sockets where each of the three bus cables attach.

6) PCB1 Power is bussed to each of the boards of the system via a separate 14 conductor ribbon cable. This cable is attached to each board via a 14 pin dual-in-line connector.

7) OPR1 The operator/reference manual set is designed to introduce the SPHERE 1 system to the new computer user. It describes in detail how each instruction works. It also describes in detail, interrupts, stack operations, Input/Output, peripheral device characteristics, memory organization, projected device reserved locations and limited characteristics, and execution timing. Programming examples are included to illustrate various hardware features and a section is included to introduce programming concepts to the first time computer user. Appendices are included to aid program development. Although this manual set is comprehensive, some users may require further information so references are amply provided. The manual set is loose bound to receive updates and includes sections where SWAP newsletters, kit assembly instructions, manuals, and maintenance manuals may be kept. Kit assembly instruction manuals are a part of the package; however, each module in kit form contains an associated kit assembly manual which may be kept in this binder. SPHERE has introduced its user group to promote interchange of ideas, useful circuits, comments, gripes, software (from games to statistical packages), announcements (i.e. user has 10 Amp 5 volt power supply for $15.00 type!). The SWAP newsletter will not be governed by the marketing arm of the company. Hopefully the users will completely govern this group in the future. SWAP membership is included with any "SYSTEM" purchase or with the purchase of the OPR1 manual set. Future membership fees will be determined by users.

SYS2/KIT INTELLIGENT ($750)

This system was specifically designed to solve the needs of two different users.

1) The user who wishes to communicate to other devices over serial lines such as a telephone.
2) The user who wishes to utilize this device as a stand alone computer, and use the communications facility to save and restore programs and data using a standard audio cassette.

The communications facility is implemented as a single module (PC board) which contains a standard asyncronous communications interface and a modem. Serial communications to other devices such as a teletype or other computer may take place without the use of a modem; therefore, the modem portion of the board is listed as a separate module (CAS1).

This system includes all of the features found in SYS1/KIT plus the following:

1) COM1 This module contains the ability to accept data in 8 bit parallel format from the CPU and transmit it serially with 1 or 2 start bits and a stop bit. Seven or eight data bits may be transmitted with optional even or odd parity. At the same time data in similar format may be received serially. The data will be checked for proper parity (if desired) and false start bits will be rejected. Communications may occur at several standard rates. These rates are strap-selectable with each board pre-strapped at 300 bits per second. Although other rates are available on this module, the standard rates are 110, 150, 300, 600, 1200, 2400, 4800, and 9600 Baud. Baudot Code teletypes can be supported with minor modification if 20% speed degredation is acceptable. X-on and X-off functions are provided by an on board relay. No cables are supplied.

2) CAS1 This module contains a complete ORIGINATE/ANSWER modem. The device has additionally been adapted to operate with an audio cassette. The modem will operate at a maximum speed of 600 Baud. It has been designed with particular emphisis on acousticly coupled lines rather than Direct Access Arrangements (DAA's). The SH, RING, +V DH, DA, DR, and $\overline{\text{GND}}$ signals are provided for the CBT type of DAA however. A speaker and a microphone are all that are required to complete the acoustic coupler. Provisions for use of this module with an audio cassette are redily available. The cassette's AUX or MIC jack may be used as computer output, and the AUX SPKR jack may be used as computer input. No cableing is provided with this unit.

John Bottoms, Box 158CTS, 1000 W. 42 St., Indpls, IN 46208 says he has just finished the first batch of TVT-II boards that he is selling for $18. They are on FR-4 (fire resistant G-10 1/16" one ounce board). The etch is done by the subtractive process using FECL. They are not plated thru or plated because 1) plating is expensive and difficult and 2) plating traps chemicals below the copper that are corrosive and can eventually shorten the life of the board. He is just getting started in business and decided to do the TVT-II boards first. One of his main concerns is to try to keep prices for amateurs as low as possible. He is willing to etch MOD-8 circuit boards if we supply him with the drawings. He had planned to work on the Mark-8 mods which would revise the clock, I/O, and memory. The CPU and one K of memory would be on one board and the remaining memory would be on an additional board. It would have no front panel. He would be glad to produce TVT-1 boards if there would be sufficient demand. John has been in digital work for 11 years and just finished his degree in computer systems engineering at Purdue. He is still working on the TVT-II memory and cursor boards and he will soon provide prices and availability dates.

August 15, 1975

John Ford
5561 Esplanada
Santa Maria, Calif.,
93454

Mr. Hal Singer
Micro-8 Newsletter

Dear Hal,

Some of your subscribers are still trying to decide if the water is too deep or the current too strong to wade in. The amount of money a newcomer might anticipate having to spend is a highly variable consideration. The following list may help define some of the costs:

1. MIKE203 Assembled computer	$325.00
2. Power Supply (Surplus)	25.00
3. CRT Interface (Suding type)	125.00
4. Cassette Interface (Suding type)	25.00
5. Keyboard-ASCII (Surplus)	30.00
6. 1K RAM	100.00
7. Misc IC's and tools.	75.00
	$705.00

The price list I've given above should be analyzed carefully. If the Hobbyist has a greater degree of hardware expertise than the author of this letter, he may purchase un-assembled kits and save $100. My 8008 system was purchased from Martin Research -- there are several other 8008 (8080, etc.) systems which may be more or less expensive. I consider the list above to be a minimal requirements list for the following reasons:

Starting with item 2 on the above list.

2. The Martin Research MIKE203 does not provide a power supply at the base price.
3. This is probably the cheapest method of obtaining reliable and flexible output from your computer...unless you can limp along with an octal or binary display.
4. It is essential to have some means of permanently storing programs. If a program is over 50 instructions in length, it becomes drudgery to re-enter the program each time the computer is turned on.
5. Most of us will require the greater flexibility of character input provided by an ASCII Keyboard.
6. In my opinion, if you are not planning to set up some fairly elaborate programs, you really shouldn't be looking at a computer. 1-4K of memory would be minimal storage for good programming potential.
7. Unless you are buying a "complete" system, you will probably find that you will need to buy some additional interfacing IC's and tools.

I think it should be mentioned that the current trend of pricing may will bring the overall costs much lower ($100 -- $200) within two years. Also, the proliferation of microprocessors may well make the current herd obsolete in short order. My expenses would have been much higher if I had not been able to draw on the hardware experience of Hal Singer and Dave Duskin.

A final note: $700 is a lot of bread, and it means that the 8008 will have to be more than a toy. It has already been an education.

John Ford

FMC Corporation

Crane & Excavator Division
1201 Sixth Street Southwest
Cedar Rapids Iowa 52406
(319) 398 3200 Cable LinkSpeedr

FMC

July 11, 1975

Micro-8 User Group Newsletter
Cabrillo Computer Center
4350 Constellation Road
Lampoc, California 93436

Dear Hal Singer:

As a recent subscriber, let me say that I appreciate your newsletter; I had previously gotten it through a friend here at our company. I also subscribe to The Computer Hobbyist, The Scelbi Digest, ECS (no Byte, with our old Ham "friend" Wayne Green), and The Digital Group. I have ordered equipment from Scelbi (8-H, audio tape, TTY interface); SWT (TVT-1, TVT-2, digital VOM-counter, keyboard); and Suding TVT (not arrived yet). I have full manuals from Scelbi, M6800, and RGS (Uhg), and Nat Wadsworth's excellent (including its errors) programming manual.

Somehow, I get the impression that Scelbi is not given the attention in your publication which is due them. Example: several class their audio interface as expensive and complicated, but like all the stuff I have received from them, it is complete (chassis, parts, and good documentation). The boards in the 8-H and interfaces are first-class PTDS (plotted through double sided), complete instructions, and large, easy-to-use schematics. Additionally, all deliveries have been prompt and reliable -- perhaps a rarity in today's small computer game.

The 3K Scelbi I have going may not be the nicest-looking machine, but it is easy to build and understand. Nat Wadsworth supplies very good documentation for those of us starting, and will answer questions in writing or over the phone (no, he doesn't even require a SASE). Case in point: I was having bit memory failures with my garden variety 1101's, and Nat suggested the test sequence and recommendations over the phone. Case in point: I ordered a PROM from him at a stated price, but when billed it was at a new lower rate -- he could have easily charged me the price at order time. Dealing with Scelbi has been a rewarding and business-like procedure, something those of us in a business appreciate. I hope your readers who are concerned about the shoddy suppliers, incomplete documentation, etc., give Scelbi serious consideration! Except for the excellent data from Suding, I feel that with the Scelbi record, and information, I wouldn't need the rest of all the micro machine data at all! I do follow with interest, however, the exploding developments taking place in this field.

I want to order a Suding calculator kit, but what is the status now on the MiniMicroMart situation for these units?

Sincerely,

C. Southard

C. Southard WAØIOT
2519 Meadowbrook Drive SE
Cedar Rapids, Iowa 52403

Pa

WILLIAM H. FREEMAN
REGISTERED PROFESSIONAL ENGINEER
816 MEADOWLARK LANE
GLENVIEW, ILLINOIS 60025
(312) 724-5547

July 15, 1975

Dear Hal:

Attached to this letter is a contribution to your NL concerning cassette transports. The company with which I am associated manufactures language laboratories, stenographic dictation practice systems and other listening systems. As we have a reasonably good knowledge of tape transports, because we use them in our systems, my comments are biased to the side of reliability but I hope they are objective. We sell our equipment to schools, so ruggedness and reliability are at the top of the list of requirements. After seeing a Phi-Deck, to put it bluntly, I wouldn't have one.

Incidentally, just today, Scott Goff, the manager of the Mincom Division of 3M was in to see me. I asked him about the availability of the 9577 deck (see my comments) to individuals. His reply was that anyone who wants one can buy one. This deck is normally sold to OEMs so I asked specifically about this point.

Another subject - I need help. After taking the course at Northwestern on microprocessors, which was sponsored by the Computer Section of the IEEE, I have been frustrated by one thing - programming. Maybe you can point me in the right direction, suggest books, magazine articles, etc., which will get me moving. Twenty years ago I had a short course (10 hours) on FORTRAN, ran 3 problems and never had occassion to use it again. I probably could read up on FORTAN and program in that, but the instruction sets of the microprocessors don't make any sense to me.

About two months ago I went to hear a talk by Capt. Grace Hopper. The talk was sponsored by the Computer department of Northwestern. Mrs. Hopper, if you don't know her, has been in computer programming since year one and has probably forgotten more about programming than any 10 programmers put together. She has a tremendous sense of humor and tells her stories dead pan but with a twinkle in her eye. (She got a standing ovation at the end of her talk.) But what I am leading up to is her comments about octal.

She said when octal first was proposed she thought it looked good and so she learned it. Then at the end of the month her check book didn't balance. So she took it to her brother (a banker) for him to look over. He takes a look and says, "You have subtracted in octal!" Mrs. Hopper said it took 3 months for her to get her check book straightened out! Her conclusion was not to use octal as one cannot program or use octal during the day and then come back to a decimal world and keep things straight.

My own reaction, from the sidelines as it were, is that a home or hobby computer should be able to be communicated with in a high level language, say BASIC, to give reasonable performance. Stone age chiselling in of 1's and 0's (Dr. Lennon's phrase) is just too time consuming. I know the hobbyist has lots of time but one does want to see some results now and then.

I do enjoy the NL in spite of my programming ignorance. I have no home computer, largely because I can't decide yet which way to jump, and partly because of lack of time (the daytime business runs into the nighttime!).

Cordially,

Bill Freeman

William H. Freeman

Comments on Cassette Transports:

Letters previously printed in the NL have proposed the use of a Phi-Deck cassette transport in connection with a cassette interface for recording data. While this cassette transport has some nice features, your writer feels he should point out some obvious disadvantages and suggest a better alternate.

The Phi-Deck has 4 d-c motors; one for the capstan drive, one each for fast-forward and rewind and the fourth motor to engage and disengage the heads thru a geneva movement. The heads are mounted on the cross piece of an inverted-U which pivots on the open end. Use of the d-c motors provides a very nice control of all the motions required in any tape transport using transistors to directly energize the motors - no relays. Logic is very easy to implement. In the sample shown to this writer over a year ago, the transport went thru its several paces with considerable agility. One can make the deck do almost anything imaginable.

Now, the disadvantages as seen by your writer. The d-c motors will have a limited life because the brushes will wear out. When this happens the motor will have to be replaced because the brushes are not accessible. An a-c motor is needed if one wants reliability and long life. The mechanical construction is flimsy. Most of the mechanism is mounted on a single flat sheet of .047" (18 ga.) steel with legs bent down in front and rear - no side fold for stiffening. Your writer has also heard that the head alignment is not always maintained by the inverted-U mechanism.

There are very few cassette transports on the American market but paying $100 for the Phi-Deck is getting ripped off. Many of you are aware of the ruggedness of Wollensak transports so why not get a solenoid controlled Wollensak. The Mincom Division of the 3M Co. has a small Wollensak transport, Model 9577, which only costs $79.75 for one. This cassette transport has a large a-c motor, a large fly-wheel, is solenoid operated (24 vdc) and has an optical end-of-tape sensing. The size of this unit is 5 5/8 x 6 3/4 x 4 25/32 deep.

For those who want the absolute best with money no object, then try the Model A9 transport made by AMILON. They have made digital transports and this audio one is derived from that. The one performance feature which impressed this writer was the <.1% wow and flutter! The price for one is about $165. It has all kinds of super specs which need not be enumerated here. It is about the same size as the Wollensak.

So there you have it. A much better alternative than the Phi-Deck with less cost and much better reliability and performance. Your writer is in a company which uses cassette transports and is not connected with any of the companies mentioned.

John J. Krohmer, 5723 N. 14th Place, Phoenix, AZ 85014 (The Heart Of Cowboy Country) called all the owners of ALTAIRS on the list that MITS supplied him and they promptly appointed him corresponding secretary which is ridiculous he says because he dosen't even have a typewriter. Several of the guys have a variety of mini's and micro's and would be interested in contacting others with similar machines. (John has an M6800 system.) They will be submitting articles, programs, etc. to the newsletter soon.

Micro-8 User Group Newsletter
Cabrillo Computer Center
4350 Constellation Road
Lompoc, CA 93436

July 11, 1975

Gentlemen,

First let me say that I think that your newsletter is a godsend to the computer hobbyist. When I received the packet of prior issues, I devoured them with the enthusiasm I normally devote only to the latest "couldn't-put-it-down" novel.

I have been in programming and computer work for over 10 years, mostly on large commercial systems (IBM 360/370, Burroughs, NCR) and some minicomputers. I have worked with several programming languages and operating systems, and have a sizable library of info on these topics and several others relating to various aspects of data processing. I would be happy to provide bibliographic information to any member (text or manual recommendations, etc.). This is both from positive and negative viewpoints -- I can recommend "winners" in the book field and point out losers (many of which I have unfortunately acquired). Programming is both a vocation and avocation to me, so I am really looking forward to using my "micro" system for "pure" programming language research, plus practical applications and "fun" things such as games and demonstration programs.

I had never had much interest in kit-building and practical electronics in general until a friend showed me the Dec. 74 Popular Electronics article, which really amazed me, since I had no idea that the smaller end of the computer scale had progressed so far so fast. After considerable attempts at investigating this new phenomenon, I learned of Bob Cook, and he put me on to the Digital Group and your publication. I ordered an Altair 8800 from Mits with the minimum 256 bytes of memory largely as a result of the spirited discussion from your pages, because before that I had been about to hand Mits most of my life savings for additional features that I then saw were available from other sources at much lower rates, and for the most part, better specifications.

For the past 2 weeks, I have been soldering my fingers together (and occasionally some components) and despite my lack of knowledge of electronics and its attendant jargon, I managed to get it all together. I was generally impressed with the completeness, clarity and quality of the Mits kit, even though I had to purchase several additional items. It does not yet operate correctly, so I can't consider it to be complete, but I have hopes that it won't be too difficult to iron out the remaining bugs. Using the display panel for input and readout, it will "deposit" and "examine" correctly, but placing it in "run" mode produces some very spooky results -- it appears to operate on some program known only to it, not the one that I stored.

I am now actively trying to evaluate the various I/O methods and techniques available, and hope to eventually come up with a system which includes 1 or 2 casettes, a super-simple (and cheap) paper tape reader, plus an I/O typewriter or teleprinter, and a keyboard-CRT combination a la the various TVT systems.

In this last regard, I am especially indebted to your publication, as I was just about to order several things from the MiniMicroMart, before reading the many adverse comments about their delivery problems and refund policies. Many of the things that they advertise (and their ad copy) are well-nigh irresistible, since they seem to have just exactly what is needed. I suppose this is just another instance of things being too good to be true. In any case, I can't believe that someone with as much evident expertise and who had taken as much time and energy to produce their bulletins would be placed in such a box for long, so I hope they get straightened out soon.

With regard to other sources, I think the Digital Group in Denver is splendid, and I have ordered their casette interface and basic software package for the 8080. My only quibble is that I seem to have been waiting a long time for their latest flyer and/or newsletter. Perhaps the whole group went on vacation.

I still haven't heard from the Computer Hobbyist in North Carolina. I'll check my next bank statement to see if they cashed my check. Ditto the People's Computer Company.

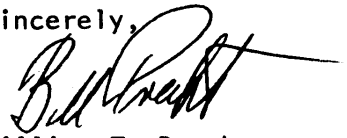
I sent for the literature package from Sphere, which uses the Motorola 6800 CPU, and they seem very ambitious but much over their head with regard to what they can deliver and support. At least they realize the tenuous situation they are in with regard to the mail-fraud laws -- every page of their specifications is stamped "Preliminary - price and specifications are subject to change without notice."

I've talked with several micro users in the Chicago area, and would like to get the "Chicago group" re-organized or re-invigorated. I think this will be a very big area for micros.

If any of your readers can specify an I/O port for an Altair, and/or a "second-source" for their (Mits') I/O boards and interfaces, I would certainly appreciate hearing from them, either directly or through the newsletter. Ditto the memory and expansion boards.

To conclude this rambling dissertation, just let me say that this is certainly the most exciting field that I have been associated with in some time, and thanks again for your publication.

Sincerely,



William T. Precht
1102 S. Edson
Lombard, IL 60148

Carl T. Helmers, Jr., M. P. Publishing Co., Box 378, Belmont, MA 02178 says that his supply of the original ECS series has been exhausted to date and he only has back issues from January onward. He is negotiating with a publisher to have the series turned into a paperback of 200 to 300 pages and is looking for people interested in contributing to such a book. These plans may have changed somewhat since he is now editor of BYTE magazine. ECS magazine subscribers have been serviced on a two for one basis to BYTE for the remainder of their present ECS subscription. The oscilloscope graphics PC board for the unit described in the last issue of ECS is available for $25 from Carl at the above address and is described by Mr. Loomis of Loomis labs as the prettiest PC board layout he has ever seen.

Christian S. Bauer, PHD, PE, Assistant Professor Of Engineering, Florida Technological University, Box 25000, Orlando, FL 32816 says that FTU is rapidly becoming a hotbed of microcomputer activity and computer hobbyists in the Central Florida area are encouraged to contact him (office phone (305) 275-2615, home phone (305) 678-2413) to discuss matters of common interest. They have projects underway involving INTEL 4040's, 8080's (wired on a general purpose interface board for use with the NOVA minicomputer), 3000 series chips, a Motorola 6800 system, and last but not least, a Mark-8 8008 system with 2K of 1101A memory as well as two TVT's.

PRACTICE LIMITED TO ORTHODONTICS

NEAL SHEFFIELD, JR., D.D.S. W4zpz
2601 OAKCREST AVENUE - SUITE E
GREENSBORO, NORTH CAROLINA 27408

TELEPHONE (919) 288-5401

August 18, 1975

Neal says he is glad to talk to any fellow hobbyist at (919) 275-7720. His MOD-8 is nearing completion. He is waiting for the "modified" modified 8316 board which should be in by the end of September (1975?) he hopes. He is using the 8316 monitor and 4K of 2102 memory and 5K or more of core, a tape deck, and the IBM Selectric I/O printer #735.

Dear Hal:

Since several IBM Selectric I/O Keyboard Printers have become available to the group, I thought they might be interested in the following:

The IBM Selectric I/O is made by their Office Products Division (OPD) for some IBM Data Systems and also for OEM use. There are a number of minor variations and optional features for each of two basic models.

The CORRESPONDENCE Model uses the same basic typing element and character arrangement as the ordinary office Selectric Typewriter. A 7 level code (Selectric correspondence bail code) is input to the machine selector magnets for character print or machine function. This same 7 level code is ouput from the machine from the keyboard transmitting contacts. code in = code out

The BCD Model uses a different arrangement of characters on the typing element and therefore an entirely different "Selectric" code is used. The OEM BCD machine will probably have a #908 typing element, ten pitch and will print upper case characters only in the lower case or unshifted mode. The upper case mode prints mostly solid blocks. The matching key tops are standard gray only.

The IBM system oriented BCD models may have keytops marked for both upper and lower case characters as well as special symbols to match the particular system. System oriented BCD elements like the #963 are available and can also be used in the OEM BCD machine if you don't mind replacing some key tops or remarking for a few different special character positions.

On the BCD machine, the keyboard transmitting contacts output a BCD code which is different from the input bail code. code in ≠ code out

Note: code conversion can be handled easily by a ROM, but be careful of "code converter" chips because of these differences. Better check the truth table before ordering.

Any of these machines may have 48 or 24v DC coils and may be wired common positive or common negative. Coils have voltage spike protecting diodes.

IBM people have been very helpful in locating the documents that are needed to interface these machines. It took a lot of digging, but here they are: see attached

Everything you want to know about the IBM Selectric I/O Printer-
and where to find it.

SOURCE/PART NUMBER	TITLE/DESCRIPTION	PRICE
OPD/241-5737-0	"Selectric" I/O Typewriter Service Manual Description, operation and adjustment of 74X, 73X, and 775. Includes wiring diagram, input, out codes, type head arrangement, contact and magnet timing charts. Also suggested external connections for ready/busy output mode. 311 pages-2 color, probably a thousand or more illustrations --highly recommended--	$3.90
OPD/241-5687	Type Catalog Typebars, elements, keybuttons and keyboard layouts. 58 pages	
DP/S124-0054-9	IBM Selectric-Universal I/O Keyboard Printer Parts Catalog Lists all replaceable parts including type heads (elements) and key buttons-covers machine types 740, ARS1415, ARS1014, 1620, 870, 1977, SABRE, STRETCH, 735/765, 735/870, 735/767, 2152. 150 pages necessary for above machines	$2.60
DP/S123-1008-7	Selectric Printer for Communication Terminals-Parts Catalog Similar to above, but for 835-2740, 935-2741,2970, 1980-9, 1980-12, 1518. necessary for above machines 130 pages	4.00
DP/S225-6595-2	Selectric I/O Keyboard Printer Basic theory of operation-most if not all is covered in first listing above. Not as complete or specific as above. 83 pages	2.92
DP/S225-1726-7	IBM Field Engineering Maintenance Manual-Selectric I/O Keyboard Printers Maintenance and adjustments, lubrication points and sub assembly removal. Good illustrations with line drawings and large halftone photographs. about 250 pages	4.45

Order through the appropriate division. DP=Data Process
OPD=Office Products Division Cost listed only where known.
There may be a charge for most others also. Inquire when ordering.
Allow 2 or 3 weeks for delivery.

From IBM /Parts Dept. No. 1159077	A-MP connecter 50 contact female-this mates with the 50 pin male connecter found in most machines. Kit of Parts (consult parts catalog for other connecter configurations) Note: Socket and contacts also available from Burndy Distributors @ about $30.00. For prototype or temporary connections use MOLEX .062 female connectors-about $4.00/c and insulate with plastic sleeving	20.00

**** **** **** **** **** **** ****

Zero force 24 pin sockets (for the MOD-8 PROM Programmer) are manufactured by Textool and are available through their area representatives advises Mr. White of Textool Customer Service Department. Call 214-259-2676 for address of representative nearest you or order from Techrep, P. O. Box 508, Indian Rock Beach, Fla. 33535. Mention Part#224-331M 24 Pin Zero force socket and enclose $7.45.

Mike Baran says his work will soon involve the Intel MCS80 micrcomputer. He writes, "My interest in microcomputers is both professional and personal. Until our machine arrives, a co-worker (Len Oleniczak) & I have been toying with an Intel 4004. We are writing an assembler and a simulator for the Intel 4004/4040 which will use (almost) ANSI FORTRAN and run on a CDC 6000 series computer. We should be well into the debugging stage by the time you receive this letter. Our next project will be to write an assembler and simulator for the Intel 8080 to run on the same machine. We are writing rather than buying for several reasons: a) cost of buying is too high and no funds are available. b) good experience to be gained thru the project c) we can include custom features where desired.

Neil A. Benson. 10040 Nicollet, Bloomington, MN 55420 has the following to say about his plans to do image processing: "I am not doing it so I don't want to go into too much detail now but the basic process is used by Stebber in QST for April, May, & June of this year. He converts Slow Scan TV (128 lines/frame, 4 lines/sec) to normal TV frame rate. In the process he averages the signal to produce 256 lines/frame and to generate another level of grey. He uses a 7483 adder and 7485 magnitude comparator. My ideas are similar but I would apply the process to weather pictures from the satellites (also see back issues of QST). By the way, Robert A. Heinlein (not Hemlein) is one of the better authors of science fiction -- 20 & 30 years ago he wrote stories which are now happening regarding computers. "The Moon Is A Harsh Mistress" is based around a computer. In "Time Enough For Love" it is difficult to seperate the computers from the people! (Don't read this TOME without first reading "Future History" as they go together. So Much for the literature class."

32200 Arlington
Birmingham, Michigan 48009

Gentlemen,

I read about your group in the Computer Bits column of the June issue of Popular Electronics and am interested in participating in a user group of mini/microcomputer hobbyists. I have just completed the construction of a basic Altair 8800 and am in the process of checking it out. I would also like copies of your past newsletters and am enclosing a stamped self-addressed envelop as requested. Thank you very much.

The construction of the 8800 was very straight foreward with a couple of exceptions and took me about thirty hours. The chassis does not fit into the cabinet with the screws furnished to mount the control panel circuit board to the subpanel and the front panel swithes should be installed with only the nuts (as shown) not with washers. I am in the process of checking out the programming instructions and have found what are apparently two errors. The PUSH instruction (page 50) states that the status bit register is the first byte pushed into memory. It is the second as the accumulator is the first. Also the CPI instruction is shown as 00 111 100 on page 70 when it should be 11 111 110 as is correctly shown on page 90.

The quality of the parts appears to be quite good. I was missing two resistors and had one defective RL-21 LED which were replaced by MITS. Communications with MITS have been reasonable but slow.

I am looking forward to hearing from you.

Sincerely,

Don H. Morrison

Don H. Morrison

S. Trim
2991 E. 43rd. Ave.
Vancouver 16, B.C.
Canada

Dear Sir:

I am presently a subscriber to your newsletter although (due to a distinct lack of money) I have no immediate plans to construct a computer. At the monent I am using a Hewlett-packard 2000F which is owned by the Vancouver City College. This is a time sharing system free to all comers, however it is completly lacking in graphics capability. This is very frustrating since my primary intrest at present is spacewar and similar interactive graphics. I am intrested in corresponding with anyone else who is intrested in this field.

If convenient I would like whatever information is available on the graphics terminal refered to in your newsletter (by James Hogenson published by MP Publishing Co.) although this information will be of little use until such time as I build a computer.

One more thing, has anybody compiled the facts on all the various computer systems (Mark-8, Altair 8800, Mike-2, Mod-8, Shelby-8H, PDP-4, etc.) if not i would suggest that this is an area worth some attention such a list comparing cost, construction difficulity parts availability, machine capability, etc would be very useful to people like me who know little about computers.

On MITS it would appear that they want to become the I.B.M. of the mini-computer market. They have adopted some of the same techniques, their apparent strategy being to encourage the use of the Altair 8800 to the point where it becomes the standard home computer under these conditions the majority of software development takes place for the Altair so that a person entering the field has the choice of going it alone or buying an Altair at an attractive price. the profits will be made by makingit difficult (by witholding bussing information) to use any but MITS peripetuals (same strategy as IBM) it is then possible to place high prices on this equipment knowing that the Altair oner can either buy from them or build their own which most people will be unable to do.

Sincerly Yours

Sidney Trim

Ernst Schubert, POB 851, Los Alamitos, CA 90720 (213) 421-0124 and (714) 826-5033 says that considering all the wasted experimentation and experiences with the various suppliers of dubious reputation, he is inclined to order an ALTAIR with 12K of memory and extended BASIC. He will start with a dual disk system (CALCOMP floppy) and will replace his teletype with a DEC-writer as soon as possible. The machine will be used for a prototype for a school system for administrative tasks and business applications. He will concentrate on software and would like to help as a clearing house for software distribution if there is a need without duplicating the activity of the ALTAIR user group.

S. Lieberman, 1489 Durango Avenue, Los Angeles, CA 90035 says he received Dave Chapman's redrawing of the Precision Systems Power Supply and wants to pass on his appreciation for outstanding work. (By the way, Dave has been receiving a lot of requests for the drawings. Apparently, the newsletter article mentioning it was confusing. He redrew them and they can be obtained from the Cabrillo Computer Center. For you guys that don't know what we're talking about, The Precision Systems Power Supply was a surplus unit that was mentioned in the original Mark-8 article. They have long since been sold out and the schematics are only of interest to those that did get one. It is possible that two different models were sent out and that the available schematic only covers one of them.

Rick Brennan, 601 South Knight, Park Ridge, IL 60068 sent the following design allowing I/O on an 8080 system, particularly the ALTAIR. He has constructed both, using one Vector Plugboard and wire wrap wire for land to land connections. He warns that lots of .1 mfd line capacitors should be put in even tho they aren't shown on the diagram. He promises to send in info on his 2102 memory board as soon as he gets time.

Notes on I/O intefaces:

Since the 8121's are TRI-STATE devices, I used them along with a memory board, that is I shared the 8095 bus drivers between my memory board and the input multiplexers. This is possible because both the multiplexers and the memory chips are TRI-STATE. That is why the AND gate is there-to combine the signals of all devices sharing the 8095's. If this is not required, then the AND gate is not needed and the output of the 7430 should be used to enable the bus drivers. However, if more input ports are desired, as would be expected, the additional 8121 multiplexers can be added along with the AND gate.

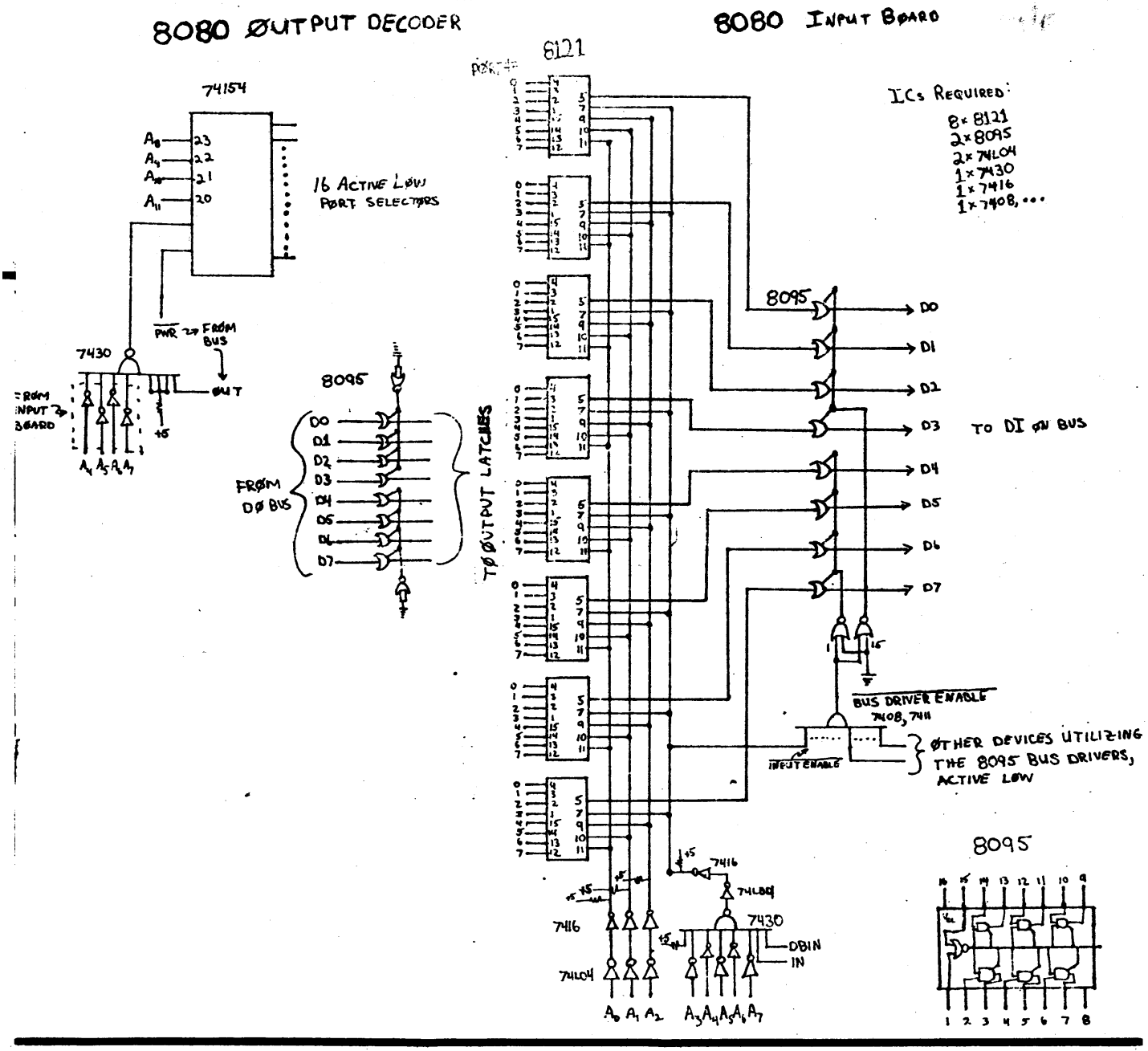
To expand the number of input ports two paths may be taken depending on how many more ports are desired. If another set of 8 is wanted, it may be cheaper to go with the 7430-74104's, depending on current prices or what is on hand. If more than 16 ports are desired it may be possible to go with larger multiplexers (if they exist-I don't know off hand) or instead of using a 7430 to decode the "high order" input address a decoder such as the one used in the output selector can beused. A 3 to 8 would give 64 ports, given enough multiplexers.

To set up ports 10 and beyond, it is necessary to determine where you want the ports to start. That is, what are the high order digits in the port address going to be? In my design, the high order address is 00. If you want the next set to follow right after, you will pick 01 as the next high order address. To make ports coincide with their chosen addresses, you must invert all bits that are going to be zero before going into the 7430. All the ones can go directly into the 7430. For example, since all the high order bits are zero in my design, they are all inverted. If you would like to add ports 10 thru 17, all bits except bit 3 should be inverted.

Remember to watch the fan-out of the 7416 buffers, they should be able to drive about 3 sets of multiplexers with no trouble.

The output port selector is capable of selecting up to 16 sets of latches to hold the data which is on the output bus. The selector can drive edge triggered latches directly, but for level clocked devices an inverter must be placed on the selector's output since it is an active low output which would cause the latches to follow the data bus whenever the latches are not selected. The nice thing about edge triggered latches is that they include nice things like preset and clear which ALTAIR owners can tie to the front panel CLR switch.

As with the input section, the output port selector may be expanded either using 7430 decoding or a decoder.



Richard J. Lerseth, 8245 Mediterranean Way, Sacramento, CA 95826 is a civil engineer heavily involved in water quality data acquistion systems under control of microprocessors which are in the planning stages at the present time. He has much experience in FORTRAN programming but the microprocessor game is new to him, both hardware and software. He has ordered a MIKE-2 system kit. He is getting into the hobby game because after 10 years of successfully programming the CDC 3300, the state is kicking him up into the supervisory staff and he wants to stay in the game. Here is some more info on his plotting package briefly mentioned in NL#8. The "3D Plot Package" is in ANSI FORTRAN is offered at duplication cost only to hobbyists. The only requirement is that it never be sold commercially for more than paper cost. (it was a personal effort "as a hobby"). A copyright has been applied for to guarantee this. It was originally written for a drum plotter but can be used with little modification on a graphic scope like Hal Chamberlin's (The Computer Hobbyist). Write Richard if you are interested.

Don Tarbell supplied us with the following list of Neat Places in L. A. for finding computer related surplus components. Compiled May 25, 1975

Earl's Supply Co. OS 9-1439
14814 Hawthorne Blvd.
Lawndale, CA 90260
Pwr. Supplies, Papter Tape Readers, Card Readers

C A Electronic Enterprises 834-5868
2529 E. Carson Street
Carson, CA
Integrated Circuits

Aber Electronics
1204 W. Washington Blvd.
Los Angeles, CA
Pwr. Supplies, Fans, IC's

Apex
San Fernando Road, Lankershim Blvd.
Large Place, all kinds of stuff

Lee Lab Supply 823-9120
13714 S. Normandie
Gardena, CA
Test Equipment

C H Sales 796-2628
2176 E. Colorado
Pasadena, CA
Tape Drives, Core, PS's, Disk Drives

Stern Enterprises 764-7070
13115 Saticoy Street
North Hollywood, CA
TTY's, Storage Tubes, Oscilloscopes
Military Surplus

NET Electronics
8218 Firestone Blvd.
South Gate, CA
Optical Page Readers, Calc. Printers
Calc. Keyboards

J J Glass Electronics
1624 Main St.
Los Angeles, CA
TTY Equip., Test Equip., Cable

Bernies Surplus 882-9414
20746 Plummer
Chatsworth, CA
Modems, IC's, Cable, PS's, Tape Drives, Card Readers, Core & IC Memory, CRT Displys, Keyboards, and loads of other junk

LMN Electronics (213) 967-4611
1042 E. Garvey Avenue
West Covina, CA 91790
IC's, LED's, Test Equipment

Hiway Co.
1147 Venice Blvd.
Los Angeles, CA
Military Surplus, Transformers

Hubbard Electronics
10861 Burbank Blvd.
(East Of Vineland)
Burbank, CA
Delay Line Memories, Card Frames, Power Supplies

I.C. Electronic Supply 892-1191
16723 Roscoe Blvd. (across from Van Nuys airport)
Van Nuys, CA
IC's, PS's, Keyboards, small parts

Sachs Co. 731-5536
3524 W. Pico
Los Angeles, CA
Military Surplus, Test Equip., Tape Drives

Vern's Surplus Electronics 864-4846
12161 E. Front
Norwalk, CA
Cable, Military Surplus

An Com Electronics Surplus 769-5518
5667 Lankershim Blvd.
North Hollywood, CA
TTY's

Electronic Surplus
10426 Burbank Blvd.
Burbank, CA
Test Equipment, Racks. Pwr. Supplies

Terminal Systems. Inc. 769-6772
11300 Hartland
North Hollywood, CA (not open on weekends)
Late Model TTY Equip.

R L Electronics 398-5377
12474 Washington Blvd.
Los Angeles, CA 90066
PC boards, Connectors, IC's

C H Surplus, 10725 E. Rush, El Monte, California.
Very large area outside warehouses. Nothing marked with price, must ask. Lots of computer equipment goes thru here but you have to catch it before it gets dismantled for the place in Colorado.

LOS ANGELES SURPLUS STORES BY WB6QDS 5/73

A-OK Electronics (235-4119)
3801 S. Broadway
L. A., CA (Downtown
8:30-5 M-F)

Aber Electronics (747-6311)
1204 W. Washington Blvd.
L. A. (Downtown 10-6 M-Sat.)

Acme Electronics (764-9000)
11523 Sherman Way (Mon to 8
No. Hollywood 8:30-5:30 T-S)

Airbourne Sales (870-4687)
8501 Steller Dr. (8:30-5 Mon-F
Culver City 8:30-12 Sat)
Exc. Catalog

All Electronics (380-8000)
905 S. Vermont (Downtown
L. A. 9-5 M-F)

An-Com Electronics (769-5518)
5600 Lankershim Blvd.
N. Hollywood (10-6 M-S)

Apex Electronics (875-5377)
8909 San Fernando Rd.
Sun Valley (9-5 M-S)

Art's Surplus (873-2626)
6212 Sepulveda Blvd.
Van Nuys (9-5 M-S)

C&H Sales (796-2628)
2176 E. Colorado Blvd.
Pasadena (9-6 M-F;9-5 S)

J. J. Candee (764-7070)
13115 Saticoy
N. Hollywood (9-5F;9-4S)

Electronic & Ind. Surplus Co.
5272 Valley
L.A. (Downtown) (8:30-5M-F)

J. J. Glass Elect. (749-1179)
1624 S. Main St. (9:30-5 M-Th
L. A. (Downtown) 9:30-2 S)

Gulf Enterprises (877-6003)
10426 Burbank Blvd.
N. Hollywood (9-9M-F; 9-5 S)

Hiway Co. (382-8383)
1147 Venice Blvd.
L.A. (Downtown) (9-5 M-S)

Hubbard Elect. (769-1137)
10861 Burbank Blvd
N. Hollywood (8-5:30 M-S)

Int'l TV (DU8-0621)
2772 W. Olympic Blvd (8:30-9 M)
L.A. (Downtown (8:30-5:30 T-S)

Also
Int'l TV (776-8830)
5144 W. Imperial Highway
El Segundo (9-6:30;F to 9)

K&M Electronics (734-0363)
1308 Logan
Costa Mesa

Mann Communications (889-6666)
28710 Canwood Rd.
Agoura

Harry Metz Elect. (734-0363)
1161 S. Vermont
L. A. (Downtown) (9-4M-F)

Jim Mills (805-646-6387)
162 S. La Luna
Ojai (hrs. by app't)

R&L Electronics (388-5377)
12474 Washington Blvd.
L. A. (near Culver City)
(8:30-4:30M-F; 9:30-4:30S)

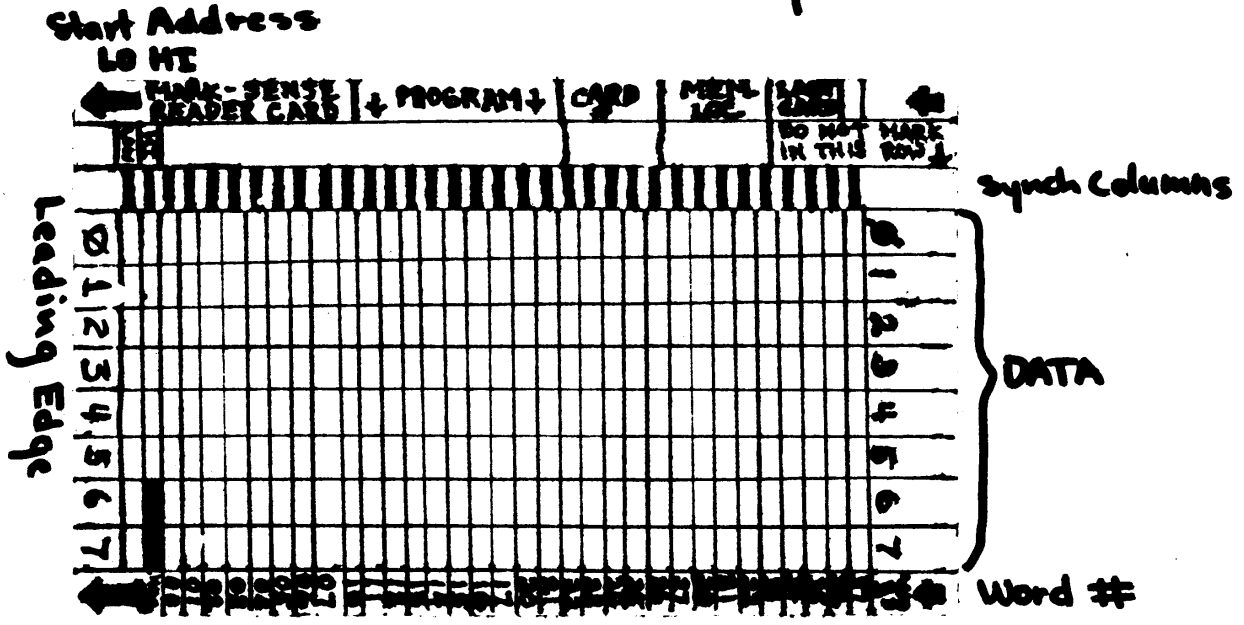
S&S Electronics (828-0242)
3311 Pico Blvd.
Santa Monica (9-4 T-S)

The Stockpile (714-537-4352)
Garden Grove (9-5 T-S)

Vern's (864-4846)
12161 E. Front St.
Norwalk (9-4:30 M-S)

Paul N. Even, 4637 Rosehill St., Philadelphia, PA 19120 (215) 457-1822 has the following comments regarding the standardization proposal (NL #6) "I believe the input and output ports should be reserved for high-speed devices such as discs, additional RAM's, tape drives, etc. Everything else can be placed on a data bus, and with 256 ports on a bus, there shouldn't be any problems about what goes where. I am using I/O ports 07 for data, and output port 10 for bus address. It might also be helpful to have a second data bus for I/O flags and other equipment. This bus can use the same address output, but only ½ of another input port in order to reserve space for the high speed devices. Why waste a whole input port for 1 or 2 flags? Steve Wash's output display circuit (Vol 1, #4, Fig. 9) is something so useful in debugging equipment that it should be a must for everyone. However, it is very easy to monitor INPUT signals by feeding in the $\overline{IN}$ signal. Add a couple more gates and a decoder, and you can monitor any I/O signal on any data bus. Another useful addition would be a second interrupt input port switched on when the front panel switches are disabled, with deposit and memory address load lines brought out. This would enable you to input programs by a keyboard, cassette, or a free-running PTR without first loading an input subroutine. The Microswitch #53RW4-1 alphanumeric keyboard sold by Bill Godbout for $19.95 is nice, but was designed for a card punch. The output can be made ASCII with a lot of diodes and some extra gates. It should be easier to use by those who have worked with card punches before. The X-Y recorder would be a real pain to build and probably inaccurate. Better to buy one surplus (like I did) for $100. Regarding the drop thru card reader, don't assign me this project because I'll probably never get around to building one, but here are some extensive suggestions: 1) To identify a mark on the card as data, you need a synchronization column. When the reader senses this mark, it latches and sends the data. For best results, have the sync lines 1/2 the width of the data boxes and centered. 2) I also propose an extra column for additional info, such as a bit to tell the computer which is the last card. Other bits may be useful for control purposes such as redefining memory locations. 3) Due to the fact that the cards are a very time-consuming thing to prepare, they must be standarized and printed in quantities for the entire user group. Also, we should be able to print specialty cards for games or surveys, with questions printed in place of some of the data blocks. 4) The most convenient size for data blocks is 1/8" by 1/4". On the rough sample below, this allows for 32 8-bit words on a 3 x 5 card. Longer cards could be used, but they may be too big for games or surveys. 5) The entire card should be printed in a light LED color Red. 6) Red LED's should be used to illuminate the Data columns so the data box lines will not give false readings. 7) A green LED is used to illuminate the sync column, so the red synch track will absorb the green light, thereby appearing black. 8) the sensors can be either phototransistors or photdiodes, but they must be closely coupled to the card surface. Fiber optics would be a big help. The IC tester should belong under software, not construction. All you need in most cases is a socket and power for the chip. Other logic families may need only simple interfacing. The only construction is for timers, schmitt triggers, op amps, and other linear functions, and its probably better to build seperate testers for these. HELP!! a) Does anyone know how to program a MM5220 ROM? b) Could someone prepare a table which lists the complete ASCII, BAUDOT, PUNCH CARD, and Morse Codes all at once? It would be a great help in making code conversion programs, and building peripherals. I just can't find all this information anywhere. That's it for now. Next time I'll send a bunch of schematics of my setup."

Paul Even's Mark Sense Sample Card



Dear Hal: July 8, 1975

Please send me a copy of the documentation on the MIL Cassette Interface which you mentioned in NL #5. I need only the data and software listings for the cassette unit since I have the other software listings in the Monitor-8 ROM. I have included the 20¢ SASE. Do you have any information on the MIL PROM programmer? If so, I would appreciate receiving it.

I now have everything to begin to put the MIL MOD-8 together. I got the boards, etc. from Maury Goldberg. The P.C. boards are really super. It's going to be orders of magnitude easier to build than the Mark 8, thanks to the plated thru holes.

What is the story on the Monitor 8-ROM? I ordered one from Maury in February; then I gave up hope when I heard that MIL had "crashed." However, two weeks ago I got an unmarked chip from him labeled Monitor 8-ROM. Has he got a new source for them, or am I one of the lucky ones to get one of the last few chips?

I hope to get my system up by Xmas. It will have 4K to 8K bytes of 2102 RAM, 2 K bytes 1702 PROM, the Monitor 8 ROM, PROM programmer, and a ASR 38 TTY. I haven't decided which cassette interface to use: the MIL version, Dr. Suding's, TCH's or whether to interface my H.P. digital cassette unit to the system.

I will probably build a front panel for the MIL Mod 8 (probably similar to Dr. Suding's design) since I have had some bad experiences trying to troubleshoot and debug programs on OEM-type systems which have only TTY access. (e.g. Q: What do you do when the Monitor Executive won't load? A: Punt and call the factory rep., who brings down a front panel to debug with at many $/hr!)

Best wishes,

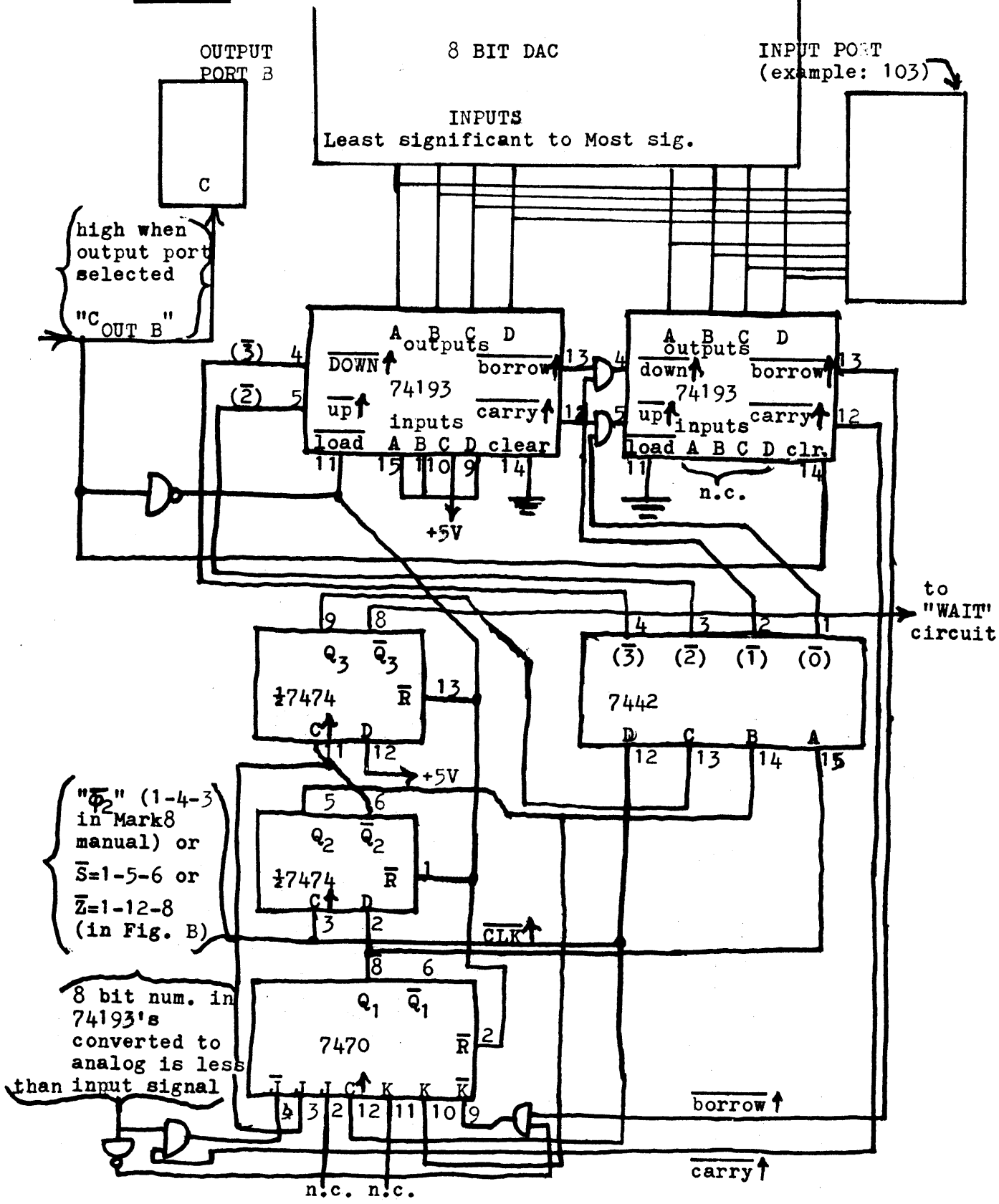
Gary

PURDUE UNIVERSITY
DEPARTMENT OF CHEMISTRY
CHEMISTRY BUILDING
WEST LAFAYETTE, INDIANA 47907

Gary W. Kramer
Research Assistant

Thomas R. Amoth, 228 Fox Rd., Media, Pa. 19063, ph:(215)566-1068, rev.7/9/75

Fig. A A to D CONVERTER



Thomas R. Amoth,228 Fox Rd., Media, Pa. 19063,ph:(215)566-1068,rev.7/9/75

Fig. B How to Change the CPU BOARD to Allow an External device Make the Mark8 Wait

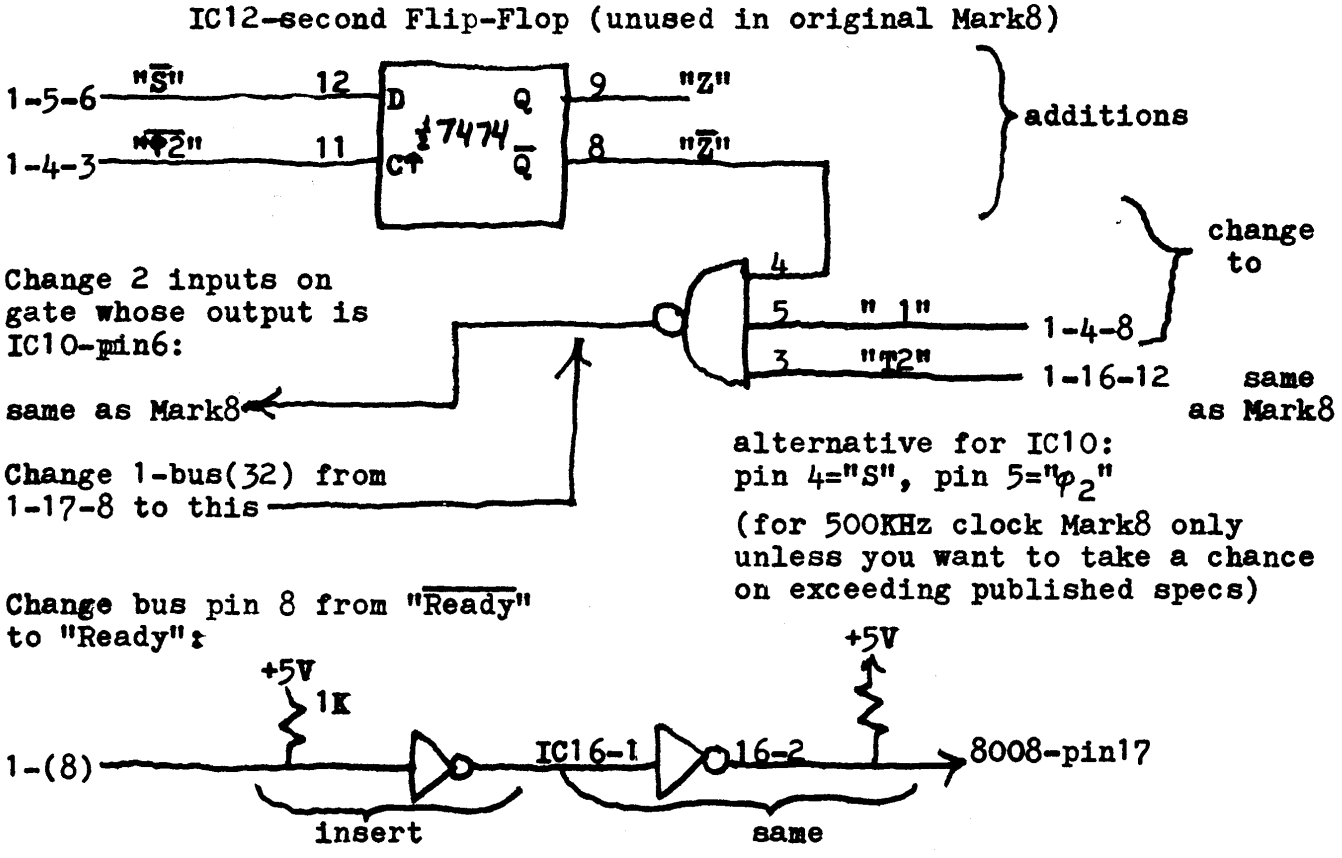
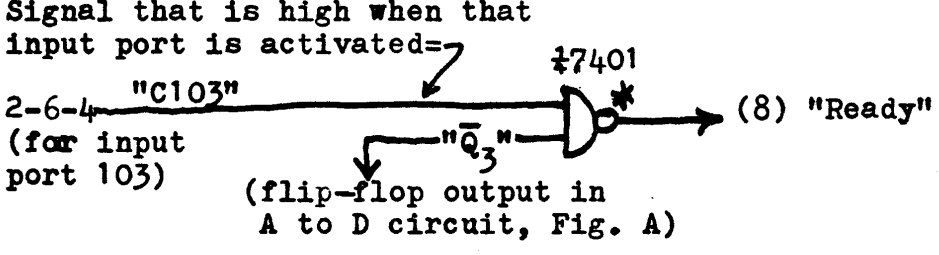
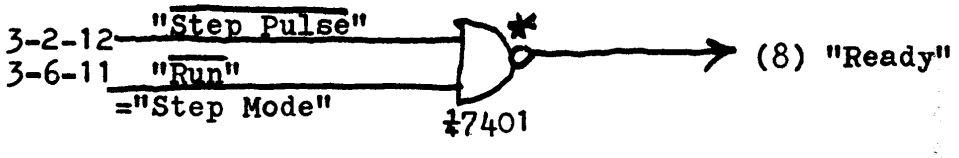


Fig. C "WAIT CIRCUIT" : Injects a "Wait" signal when octal 103 is executed and the A to D converter circuit is not finished.

Multiplexer Board:



Address Board (#3) modification:

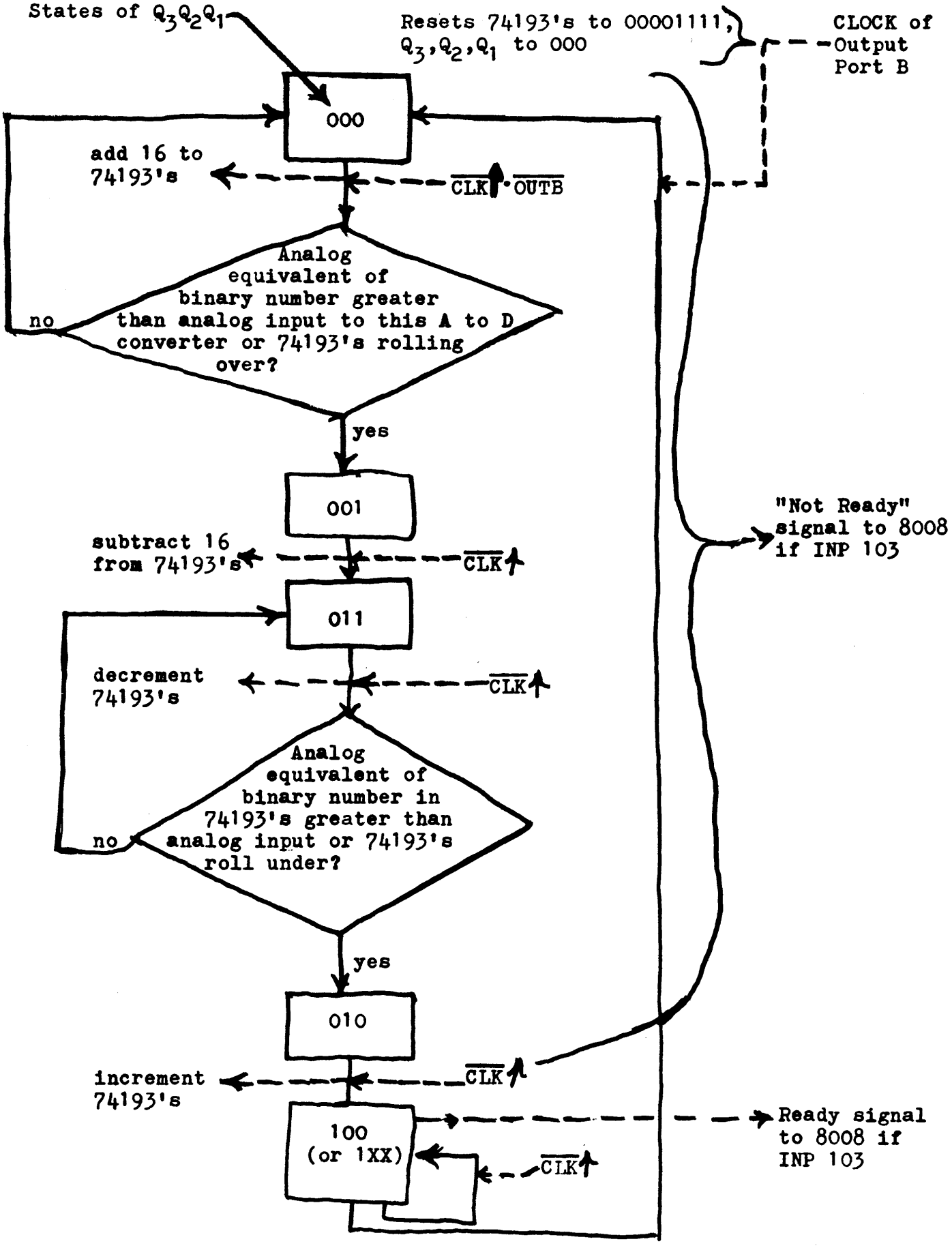


Note: with this open-collector "Ready" bus, any number of I/O ports can be made to cause the Mark8 to wait until they are ready for data to be transmitted. This will greatly simplify the programming when doing I/O to one device at a time. Even I/O to many devices simultaneously can be simplified by setting up one input port to input up to 8 "device ready to transmit data byte" signals, and using a loop that uses JTZ instruction to terminate looping when a "1" bit from one of the devices occurrs.

Also note that some sort of circuit at least similar to this must be used in order to allow memories with access times greater than 1.5us to be used with the Mark8.

Thomas R. Amoth, 228 Fox Rd., Media, Pa., 19063, ph:(215)566-1068, rev.7/9/75

Fig. D FLOW CHART for Flip-flop States (of this A to D Converter)



MICRO-8 COMPUTER USER GROUP NEWSLETTER
HAL SINGER & JOHN CRIAG -- EDITORS
CABRILLO COMPUTER CENTER
4350 CONSTELLATION ROAD
LOMPOC, CA 93436

SEPTEMBER 10, 1975
VOLUME 1, #11

THE LONG AWAITED ROSTER IS FINALLY HERE. OUR PRESENT MAILING LIST OF ABOUT 900 NAMES IS INCLUDED IN THIS ISSUE. NEWSLETTER #12 WILL C ONTAIN ANOTHER 800-900 NAMES AND ADDRESSES OF PEOPLE WHO HAVE REQUESTED S AMPLE ISSUES BUT HAVE NOT SUBSCRIBED AND A ZIP CODE CROSS REFERENCE FOR THE COMBINED LISTS.

SO MUCH GOOD MATERIAL IS WAITING TO BE PUBLISHED THAT IT HURTS T O USE THIS MANY PAGES FOR A ROSTER BUT ONE OF OUR FUNCTIONS SEEMS TO BE TO GET PEOPLE TOGETHER AND FOR THIS THESE ADDRESSES SHOULD BE INVAL-UABLE.

HOT NEWS

1) THE RUMORED MITS ALTAIR-880 IS HERE. READ ABOUT IT IN THE NOV. POP ELECTRONICS. AT $293 (INTRODUCTORY PRICE UNTIL DEC. 31) YOU CAN'T BEAT THE PRICE WITH A STICK IF YOU WANT A 6800 CPU. THEY HAVE IT ALL P LANNED OUT FOR THE XMAS MARKET COMPLETE WITH A PROMISE OF A CARD IF THEY CAN'T DELIVER BY XMAS. LET'S SEE WHAT KIND OF DELIVERY THEY CAN COME UP WITH THIS TIME THRU. BART DICARLO, 308 N. BRADFORD ST., SEEFORD D ELAWARE, 11973 ORDERED ONE BY TELEPHONE FROM MITS AND THEY DIDN'T KNOW THE PRICE AND DECLARED HIS THE FIRST ORDER. DICK AND LOIS HEISER O F THE COMPUTER STORE, 11656 W. PICO BLVD., LOS ANGELES, CA 90064 (213) 4 78-3168 HAVE A PREFFERRED DELIVER AGREEMENT WITH MITS AND THEY AC-CEPT BA & MC CARDS SO YOU MAY WANT TO CONSIDER ORDERING FROM THEM. I'VE O RDERED ONE FOR THE CABRILLO COMPUTER CENTER THRU THEM.

2) THE 8080 WILL SOON SELL AT $30. THAT'S THE 100 QUANTITY PRICE AN-NOUNCED BY A LARGE 2ND SOURCE. THAT APPARENTLY MEANS THAT LARGE SUPPLY HOUSES CAN SHORTLY SELL THEM AT $30 IN SMALL QUANTITIES ACCORDING TO A S OURCE IN THE KNOW.

3) INTEL IS RUMORED TO BE TIRED OF COMPETING IN THE CUT-THROAT COMPONENTS M ARKET AND WILL PROBABLY DROP SOME KITS ON THE MARKET SOON AS WELL AS GOING MORE INTO SYSTEMS. ONE RUMOR HAS IT THAT AN INTEL 8080 KIT WILL SELL COMPLETE FOR ABOUT $280. ANOTHER THAT INTEL AS WELL AS ROCKWELL WILL HAVE A SINGLE CHIP FLOPPY DISK CONTROLLER.

4) MOS TECHNOLOGY IS ALSO RUMORED TO BE LOOKING AT THE KIT MARKET. THEIR MCS 6501 & 6502 CHIPS AT $20 & $25 EACH LOOK GOOD. SEE BYTE #3 FOR ADDITIONAL DETAILS.

5) BILL GODBOUT HAS RUN INTO SUPPLIER PROBLEMS WITH THE PACE SYSTEM WHICH IS ALSO SLOWING DOWN DEVELOPMENT ON THE MSI-11. HE HAS SOME NEAT A LTAIR RAM & PROM PLUG COMPATIBLE MEMORY BOARDS AND IS OFFERING 2102'S F OR UNDER $2 EACH. SEE BYTE #3 FOR HIS AD. ALSO WRITE FOR THE INFORMA-TIVE PACE KIT INFO.

6) JOHN BURGOON, SOLID STATE MUSIC, 1222 CAROLYN DR., SANTA CLARA, CA 95050 HAS CANCELED PLANS FOR THE 8080 SYSTEM IN LIGHT OF THE RUMORS RE-GARDING KITS AND SYSTEMS FROM THE BIGGIES. THE WELL UNDER $200 ALTAIR 8K MEMORY BOARD IS SLOWED DOWN BECAUSE THE ENGINEER WORKING ON IT IS WORKING 7 DAY 12 HOUR WEEKS AT HIS REGULAR JOB. JOHN IS LOOKING FOR SOMEONE ELSE TO CARRY ON THE PROJECT. JOHN DOES HAVE SOME SPECTACULAR DEALS FOR US. FOR THE ALTAIR 8800 OWNERS:

MB-2 (4K 2102-1 500 NS ALTAIR MEMORY PLUG IN) - KIT $100, BOARD $20
I/O-1 (ALTAIR PLUG IN, 2 COMMITTED I/O PORTS - LARGE KLUGE AREA THAT HOLDS 34 WIRE WRAP SOCKETS) KIT - $35, BOARD $20
I/O-2 (ALTAIR PLUG IN, HOLDS 2 INPUT PORTS, 2 OUTPUT PORTS AND A UART PLUS A SMALL KLUGE AREA OR CAN HOLD 8 1702A PROMS. VERY VERSATILE BOARD) KIT $35, BOARD ONLY $20

FOR MARK-8 BUILDERS & OTHERS:
MB-1 (4K 2102 MEM BOARD 86 PIN EDGE CONNECTOR) KIT $100, BOARD $20
U B-1 (KLUGE BOARD, MATCHES ABOVE) $18
UB-1A (SAME AS UB-1 BUT BOARD MAKER GOOFED & USED GREEN BOARD) $15
1702-$10, 1702A-$14, 2101-$5, 2102-$2:100/$150, 2102-1-$2.50:100/$200,
2 102-2-$2.25:100/$175, I8212-$4, DM8097-$1, DM8131-$1.50, DM8834-$1.50
M ORE DETAILS ON I/O-2 IN NL #12. IT'S NEAT FOR THE ALTAIR 8800 USER!!

7) NOT ALL RUMORS ARE TRUE. BYTE SUBSCRIPTIONS SEEM TO BE NEARER TO 10,000 AND THE FIRST ISSUE WASN'T MOSTLY ADVERTISING. CARL HELMERS AND WAYNE GREENE HAVE ACCOMPLISHED A MAJOR MIRACLE. THE FIRST THREE ISSUES HAVE BEEN SPECTACULAR AND FUTURE ONES SHOULD JUST GET BETTER. YOU HAVE TO SUBSCRIBE!! WRITE BYTE SUBSCRIPTION, PETERBOROUGH, NH $12 PER YEAR.

8) MARTIN RESEARCH IS NOT DELIVERING MEMORY BOARDS & I/O BOARDS YET. 8080 BOARDS ARE BEING ADVERTISED AND WE CAN'T EVEN GET DELIVERY ON THE 8008 SYSTEMS. JOHN FORD AND I HAVE A SUDING TVT, KEYBOARD, SUDING CASSETTE, HITS CASSETTE SYSTEM, AND SOON A CREED INTERFACE WORKED OUT IN W IRE WRAP. WE'LL SEND YOU A COPY IF YOU'LL SEND US INFO ON YOUR MIKE-2 P ROJECT, SOFTWARE YOU HAVE WORKING ETC.

9) THE DIGITAL GROUP IS SENDING OUT 3 FLYERS THIS MONTH ANNOUNCING THEIR N EW DEVELOPMENTS. WRITE THEM IF YOU ARE NOT ON THEIR MAILING LIST. WOULD YOU BELIEVE A PHI-DECK CONTROLLER FOR UP TO 4 DECKS, 370 CPS, ERROR R ATE (1 WEEK TEST 2 PROTOTYPES) SOFT (1 RETRY) 1/3 MILLION, HARD 1/14 MILLION. NOT YET BUT SOON AND FOR WELL UNDER $200.

10) FORMATION OF LOCAL GROUPS IS OCCURING AT A DIZZYING RATE. NEARLY 5 00 PEOPLE ATTENDED THE LAST LA GROUP MEETING. AN ACCOMPANYING PROBLEM I S THE PROLIFERATION OF SPECTACULAR NEWSLETTERS. TO REMAIN CURRENT YOU MUST OBTAIN A COPY OF EACH CLUB'S NEWSLETTER. IF YOU TRY TO BUY EVERYTHING, YOU'LL END UP WITH HUNDREDS OF DOLLARS EXPENDED SIMPLY ON L ITERATURE. THE SOLUTION IS ELUSIVE. TO PUBLISH A LARGE INFORMATIVE N EWSLETTER COSTS MONEY (FAR MORE THAN MOST PEOPLE REALIZE). A PARTIAL SOLUTION IS TO TRADE NEWSLETTERS AMONG LOCAL GROUPS AND SET UP A LENDING L IBRARY. WIDESPREAD UTILIZATION OF COPYING MACHINES SEEMS APPROPRIATE B UT CAN BE SOMEWHAT SELF-DEFEATING SINCE LACK OF PAID SUBSCRIBERS NECES-SARILY MEANS A SMALLER NEWSLETTER. MINIMIZING AN INDIVIDUAL'S EXPENSE AND MAXIMIZING HIS EXPOSURE TO ALL THE NEWS IS ESSENTIAL. SUGGESTIONS A RE REQUESTED.

11) HEATHKIT IS VERY SECRETIVE BUT MAY COME OUT WITH SOMETHING VERY SPECIAL WITH LOTS OF DEVELOPMENT MONEY BEHIND IT. THEY ARE STILL C LAIMING THAT THEY ARE NOT SURE THERE IS MARKET POTENTIAL IN HOBBY COM-P UTERS.

12) TWO CANADIAN COMPANIES ARE OFFERING MOD 8 AND 80 SYSTEMS. WRITE MODUCOMP INC., 75 CALIFORNIA AVENUE, BROCKVILLE, ONTARIO, CANADA K6V 5Y6 (613) 342-5041 AND GREAT NORTHERN COMPUTERS LMTD., 41 CLEOPATRA DRIVE O TTAWA, ONTARIO, CANADA K2G 0B6 (829) 255-9640 (GREAT NORTHERN EXPECTS TO BE ABLE TO SUPPLY SOME GREAT HAM RADIO SOFTWARE).

13) I'VE PROMISED MANY PEOPLE LOTS OF THINGS AND DELIVERED ON A LOT OF THESE REQUESTS. HOWEVER MANY OF YOU MAY HAVE GOTTEN IGNORED. IF I W AS SUPPOSE TO SEND YOU SOMETHING, DROP ME ANOTHER NOTE AND AT LEAST YOU'LL G ET A NOTE WITH THE REASON WHY I CAN'T DELIVER OR THE ITEM YOU NEED.

THANKS, HAL SINGER

M ICRO-8 NEWSLETTER SUBSCRIPTION INFORMATION

ISSUES 5 - 12 $6.00 MAILED FIRST CLASS
BACK ISSUES 1 - 4 $3.50

MAKE CHECKS PAYABLE TO CABRILLO COMPUTER CENTER
4350 CONSTELLATION ROAD
LOMPOC, CA 93436

Ken A. McGinnis
Box 2078
San Mateo, Ca. 94401

Dear Hal,

Can you believe the Mark 8 Newsletter had its first anniversary on 14 September? I still have my blue copy. Keep up the good work.

An update on the Phi-Deck: My cost is $84.78 and this will increase a little October 15th. I can still deliver for under $90 in the U.S.(Plus tax if in Calif) I'm now having cabinets built for either 1 or 2 decks. I have ordered the new bidirectional Deck with I.C. controller. Anyone who ordered an old-style deck from me can convert it cheaply. More on that later.

After reading the last newsletter I wrote to Mincom about their cassette decks. They were very prompt and most helpful. Several models are available. A solenoid operated deck with one AC motor is $74. A stereo P/R head like the Phi-Deck cost $7.20 extra. Wow and flutter is said to be .25%. If anyone wants this deck I will order and try to get a quantity discount.

Since the Phi-Deck specs are much better (W&F .17 or less) and since several companies are building controllers I don't plan to get the Mincom unit now. As far as reliability goes probably both decks will outdate before they break down. Phi-Decks have been used for years in language labs and they are completely reliable.

The Homebrew Computer Club still meets every other Wed. at 7PM at the Stanford Linear Acclerator Center and everyone is welcome. Our Newsletter is $6 for 12 issues. Write to Bob Reiling, Homebrew Computer Club, Box 626, Mountain View, Ca. 94040

Sincerely,

Ken

6515 Kenview Drive
Cincinnati, Ohio 45243
September 24, 1975

I believe you should continue your newsletter after the first of the year. I believe if fulfills a need for the computor hobbyist in areas where no other publication covers.

I eagerly lookforward to each issue. It is newsy, technical, practical etc. I am a subscriber to several other publications, but yours fills a gap the others do not.

I wish you would publish more information if you have it about Martin Research equipment and the results users have had with it. I would like to see some professional comments on the equipment and what it has and does not have to offer compared to others. True t'ey did away with the lengthy readout on the front of it, but a friend of mine in this area advises the place he works they tried to do the same with their computor systems and when they ran into trouble wired up the stuff Martin says not needed. I have not been able to determine if Martin had really some other features which supplemented the did away with circuitry.

I have built up a Dr. Suding TVT and acquired a Clare Pender keyboard from Philadelphia which I had trouble with TM S5000NC chip in being bad. Several versions of why including that I attempted to operate it with out removing the black grounding material. I thought first that was protecting it from mechanical abuse. I since have determined that stuff very conductive to short out electrical fields in transit, but a good friend of mine advises some times when this stuff not removed you can blow the chip if you try to connect it to power. Another friend connected his to power with the material on and it did not work till he took off, but it did work then. So does it or does it not in some cases blow up the TMS5000NC. TMS5000NC not directly available from Texas I. either, you must go back thru keyboard mfg as it a special deal for that keyboard alone. Dr. Suding now also marketing same keyboard but have no other info.

Edward Zibulka

the digital group

po box 6528, denver, colorado 80206

October 3, 1975

The Digital Group is extremely excited about new products we have in store for the month of October that we believe will be of great interest to hobbyists and club members.

Dr. Robert Suding has been working with the Digital Group full time and has been busily putting the finishing touches on all parts of his systems. With all due modesty, we think you will find Dr. suding's systems and all the peripherals as nifty as we do -- at very competitive prices.

We want your club members to find out for themselves just how good our quality is, so we have decided to offer a tempting special reduction on Dr. Suding's original TV Readout Kit. The regular price of $95.00 has been reduced to $75.00 for the same high quality full parts kit. That's a savings of over 20%.

In addition, if 10 kits are purchased from the same club and shipped to the same address, we will discount the price an additional 10% (or $67.50 per kit).

This is an example of the discounts we expect to be giving clubs making group purchases. With our increased volume and broader product line, we can pass along savings to clubs like yours.

Neat, huh? The Digital Group

RE: SOFTWARE DEVELOPMENT:

Dear Mr Singer;

To assist your cause in developing software for microprocessors I would like to offer some help:

We are opening a timesharing service covering (213) and (714) areas from Los Alamitos by end of September 1975. The system will support NOVA machine language and a very advanced BASIC suitable for sophisticated business applications.

We have a simulator for INTEL 8008 which has to be cleaned up and some rudimentary portions of a BASIC interpreter written in BASIC for plugging in the macros for various hardware instruction sets. This timesharing service will support upto 300 baud terminals and can be made available for $ 3.00 /hr after 5:00 pm MO to FR, all day Saturday and Sunday. There is a nominal charge for CPU time and disk storage.

For further details we would appreciate inquiries with SAE; we plan major refunds for the programs which are of interest to others in the form of royalties from use of those programs.

Any suggestions will be considered.

Sincerely yours,

ERNST SCHUBERT.

QUIKDATA

Turnkey Software

ERNST J. SCHUBERT Ph.D., Prof. Engr. EE.

(213) 421-0124 & (714) 826-5033

POB 851 Los Alamitos 90720

The MOD 80 Documentation Package

The MOD 80 is a microcomputer system designed around the 8080 CPU. This system is designed to run with the powerful Monitor 80 Software. The Monitor 80 can accept and dump symbolic code, execute breakpoints and display the 8080 registers flags and the contents of memory pointed to by the H and L registers. Further the Monitor allows one to examine and modify the contents of memory from a keyboard in octal, perform octal dumps,load the system in octal and allows for the copy and translation of code so it can be run in another section of RAM. The system also has a prom programing routine for 1702AS. This Monitor runs in 2-1/2K of memory -

A basic MOD 80 consists of:

A teletype I/O board
An 8080 CPU Board
2K Static RAM Boards
2K 1702A Prom Boards
A 3 8-bit output port board
A 3 8-bit input port board
A backplane or mother board with integral 1702A Prom programmer.

The boards for the system are double sided plated through and are of exceptional quality. They cost $ 13.00 a piece except for the backplane which is $ 26.00 and are available from

Space Circuits
156 Roger Street
Waterloo, Ont. Canada

I feel that this system is very cost effective, well designed and represents an intelligent alternative to such systems as the Altairor Mark 8. I have a system up and running and I am very impressed with its performance. The Monitor with its symbolic input and output capabilities both speeds and eases programming. The installation of peripheral devices is simple. The system when constructed is not a barebones installation but rather allows immediate and powerful use of the 8080.

I am selling a Documentation package for this system which includes -

A description of Monitor 80 commands
The Monitor 80 listing
Parts lists
Component placement diagrams
Schematics
Debugging hints
Documentation on the MIL tape interface
8080 software for the tape interface

The cost is $20.00

A Documentation package is also avilable for the MOD 8, an 8008 Microcomputer System with much of the same specifications as the MOD 80. This system is upward compatible with the MOD 80.

The cost is $ 10.00

Also an update of the MOD 8 documentation with all information needed to upgrade a MOD 8 to a MOD 80 is available. This update includes everything in the MOD 80 Documentation Package not in the MOD 8 Documentation Package.

The cost is $ 10.00

ROBERT SWARTZ

195 IVY LANE

HIGHLAND PARK, IL. 60035

I am quite impressed with the digital groups TV readout. It is one of the first of a new class of very inexpensive peripherals. The T.V. readout consists of one printed circuit board which is attached to a latching 8 bit output port. The board puts out a composite video signal which will drive a T.V. monitor or a properly modified T.V. set. The design uses a 7 x 9 character generator and has a density of 32 characters per line and 8 lines. The character set consists of 128 different characters including upper and lower case ASCII Greek lower case and a number of special symbols. Because of the low density of the readout and the 7x9 dot matrix the display is large and very readable.

The board puts out composite video and there are three ways to attach it to a T.V. One is to get a monitor (which I did.). The second is to modify a television which will probably require an isolation transformer and the third is to build a small transmitter.

I am told that transmitters tend to add jitter to the display. The board, the crystal and the character generator were purchased from the digital group for $50.00. TTL was purchased from Gerber Radio Supply in Dedham, Ma. The 1101 memory was from some surplus stock I acquired. The prices for the display are as follows:

$20.00 for character generator
50.00 for P.C. board crystal and character generator
95.00 all parts and board
125.00 assembled and tested.

There was about a month delay in delivery but I am told that now this device or kit is being delivered from stock.

The kit went together easily and worked essentially the first time. The documentation consisted of a parts list, some directions for testing, components placement and schematics. There were additionally some notes on software but the main software support is contained in a separate digital group package which costs $7.50.

As for the performance of the unit, it must be realized that this board is not a teletype replacement. The system has a few quirks first to output a character you must first output the character and then output 000 to clear a oneshot in the write circuitry. Second, the device has no cursor, but this problem can be partially solved by filling the screen with all periods. Also Phil Mork has a modification that allows an invisible cursor to be added. The display does not accept carriage returns or line feeds, so lines need to be blank filled. Everything considered, the T.V. readout is a very good, no frills, cheap alphanumeric display.

29 August 1975

Dear Hal,

Enclosed is a tape and dot layout for the Suding Cassette interface. We had considered selling pc boards for it, but our time constraints won't let us do so. People with Stampit-Etchit kits can use the pattern to lay out their own boards thereby skiping the hassle of trying to lay out the system with minimum jumpers, etc. There is only one jumper required (between the two small pads in the middle of the tone filter (left hand) section. There was about a three month lag between when I laid out the tape and dots and finally plugged the components. In the interim I managed to misplace the parts placement diagram. I had little difficulty figuring out where the components went simply by referring to the Digital Groups schematic included in packet #1. A word of warning though. Do not solder components until you have them all plugged in and are sure they are in the right spot. Even though I laid out the board, I still couldn't remember the rationale for some of the part locations!

The pinout connections from left to right looking down on the board from the foil side are as follows:

1. Ground
2. Cassette speaker
3. Not used
4. -9 VDC (tone to digital)
5. +12 VDC
6. +5 VDC (tone to digital)
7. Not used
8. Input port Bit Ø
9. Output port Bit Ø
10. -9 VDC (digital to tone)
11. +5 VDC (" " ")
12. Cassette mike

Packet #1 from the Digital Group is absolutely essential for Mark 8 owners. The price is less than the xerox copying cost, and the information content is tremendous. While the TCH Cassette interface is a more thorough design with many more features, you can build Suding's version for less than $5.00. Its worth twice that just to be able to use the cassette included with the Digital Groups packet #1.

I was very upset to read in the last newsletter that you were even considering giving up the Micro 8 Newsletter. NO,NO, a thousand times NO!! I get more enjoyment and information out of the NL than any of the other publications in the field. If you need more money, put out a call and I am sure the responce will astound you. Make one of the subscription requirements be a one page article. Charge for advertising. Do anything, but don't drop the newsletter!!

M-Tech Engineering, Inc will be at the ARRL National Convention at Reston, Virginia September 12,13, and 14. There is supposed to be a microprocessor seminar. Either my partner or I will attend (depending on which one of us is the strongest and quickest out of our booth) and we will try and get you a copy of whatever goes on for a future newsletter.

One last comment, I received my assembled Digital Group TVT and it works great. Delivery was a trifle slow, but nothing to really complain about. Not so delighted with their first newsletter. Thought the information content was well below the level established by TCH and the Micro 8 letters.

Lee S. Mairs c/o M-Tech Engineering, Inc., Box C, Springfield, Va. 22151

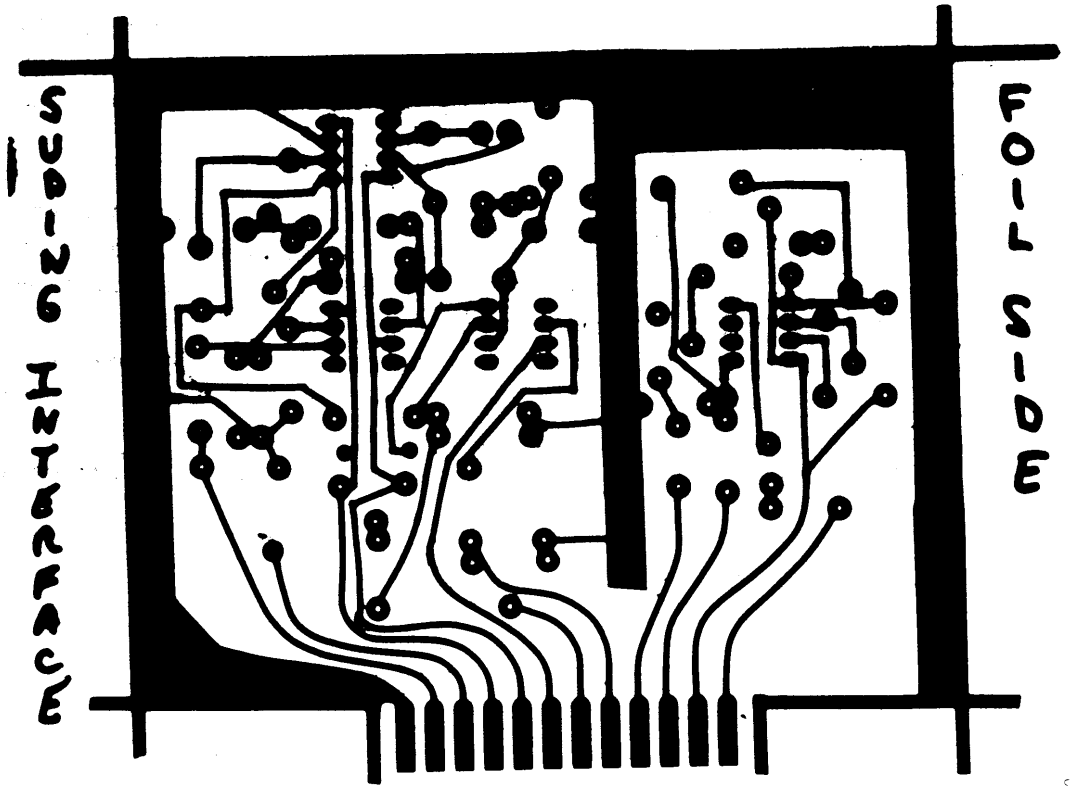
Construction Tips:

A great time saver that eliminates the drudgery of stripping insulation from small bits of wire when breadboarding on vector board can be had by using Belden's Beldsol enameled wire. When you solder with a tip temperature greater than 700 degrees, the enamel breaks down allowing a good solder connection. I wired the entire 160 pin per connector, 12 connector backplane using Beldsol #8054 which is a #28 enamel wire. I also used it to breadboard and finally build the Titus test probe mentioned in an earlier letter. By the way, the Titus probe is an absolute must for anyone owning, building, or thinking about building a microprocessor. For about $3.50 in parts you have a poormans high speed scope. I have caught pulses as fast as 10 nanoseconds with it.

Whenever you suspect a bad chip in your Mark 8, sacrifice the IC rather than fight the hassle of trying to unsolder it. The odds on not lifting up some of the foil at the same time are prohibitive. Cut the bad chip from the board using a pair of small diagonal cutters, cutting the leads as close to the IC's body as possible. Having removed the chip, bend each lead slightly apart from vertical. Next take an IC socket of the proper vintage and solder its leads to the IC leads. As well as not lifting any of the pc board foil, you now have an excellent IC tester! This is a great help for future projects and for assisting friends building or about to build a Mark 8. I purposely sacrificed an 1101 in order to build an 1101 checker prior to installing IC's on my second K of 1101 RAM. Needless to say, having gone to all the effort to check the new 1101 RAMs, not a single one was defective!

Parts Available from M-Tech Engineering,Inc., Box C, Springfield,Va. 22151:(703)354-0573
UA3656 256x1 RAMs equiv. to 1101 except faster--$1.35 ea.
Opcoa SLA-1 LEDs seven seg. display, common anode--$1.50 ea, 4/$5.00, 9/$10.00
Opcoa red LEDs $.18 ea. or 7/$1.00 Green LEDs $.25 ea. or 5/$1.00
Capacitors: 5ufd @ 15WVDC 15/$1.00 100 pf. 50WVDC 40/$1.00
115VAC-18VAC @150ma. transformer $.75 ea. Include postage. Min. order is $5.00

Lee S. Mairs c/o M-Tech Engineering,Inc. Box C Springfield, Va.,22151,703/354-0573



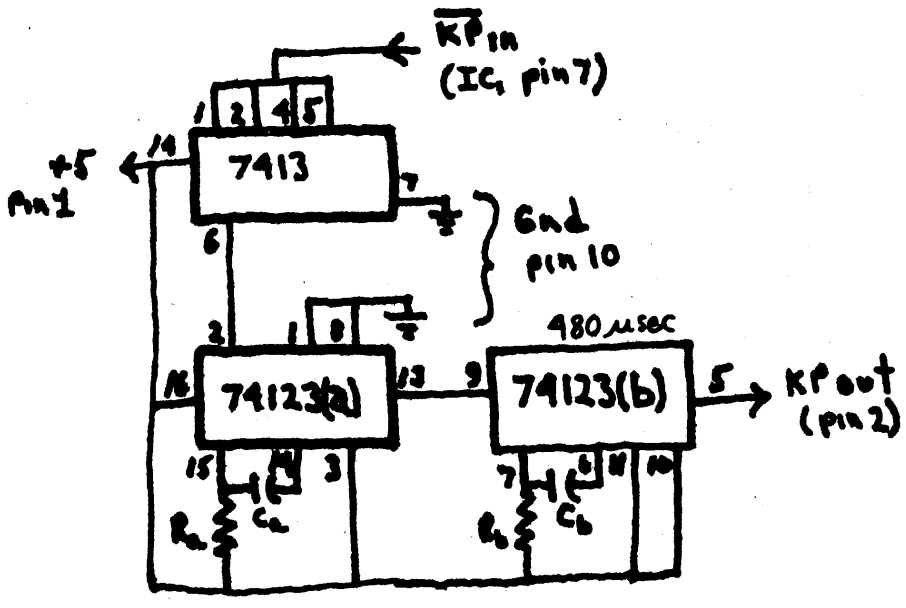
SWTP Keyboard Modification

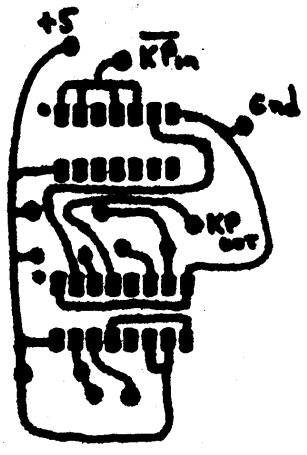
Interfacing the Southwest Technical Products keyboard to a TVT becomes a cinch with the following modifications. As noted in an earlier NL, the keyboard keypressed (KP) strobe is a negative going pulse with a very slow rise time on the trailing edge. The 7413 serves to clean up the KP signal, while the 74123 dual single-shot multivibrator chip provides the approximately 500 usec. pulse width necessary for the Suding TVT software available from the Digital Group.

Only one change is necessary to make on the Keyboard printed circuit board, and it is readily put back to normal if you ever want to sell the keyboard. Simply break the foil between the KP pin on the output connector (pin 2). The input to pins 1,2,4, and 5 of the 7413 Schmidt trigger is connected to the IC1 pin 7 side of the foil break. The output of the 74123 (pin 5) is then connected to the output connector pin 2 side of the foil break. The +5 volts and ground are connected to pins 1 and 10 respectively on the keyboard output connector.

The foil diagram below can be used as a guide for those owning a Stampit-Etchit kit (available from M-Tech Engineering, Inc, Box C, Springfield, Va, 22151 for $9.95 plus postage). The approximate time to make the pc board with the Stampit-Etchit kit was five minutes.

With the modification I am now able to type away without any of the undesired extra spaces and slashes that used to sneak in to the display. Since I had been convinced that I was going to have to spend another $50 for a decent keyboard, I has already saved the money. This modification allowed me to use the money for another 1K of 1101 memory!





$T_w = .4(R)(C)$

R_a = 15K ¼ watt

C_a = .47ufd tantalum

R_b = 12K ¼ watt

C_b = .1 ufd tantalum

Lee S. Mairs M-Tech Engineering, Inc. Box C Springfield, Va. 22151

703/354-0573

F. General Comments on Suppliers vs. Hobbyists Responsibilities - This is just a chance for me to get a few things off my chest relative to the computer hobby market. I feel that some manufacturers or kit makers are taking unfair advantage of the hobbyists, and the hobbyists should not let them do it. These manufacturers start on less than a shoestring and promise fantastic computer systems and software using multi-page ads in the national magazines, elaborate fliers, and even mobile homes (caravans) showing one "working" system. Then they proceed to get lots of orders from the hobbyists, and only then do they begin to develop the systems that they've promised. Of course, by that time they're starting to get pressured to make delivery, and so what suffers most is the basic digital design (designs must be made, prototyped, checked, redesigned, etc.).

The hobbyist gets a pretty box full of electronic worms! Systems are generally cheap because shortcuts have been taken; power supplies tend to be underdesigned and grossly underfiltered (capacitors cost more than IC's), no thermal studies are done to ensure proper chip temperatures and power supply heat removal--- typically a fan is stuck somewhere on the box; debouncing and decoupling circuitry along with race conditions are seldom considered and the hobbyist burns his time up chasing "ghosts" throughout his system; underspec or even reject components are shipped with the hobbyist left to be the company's quality control feedback; etc. etc. Not only does the hobbyist get a bum design, but he gets it two or three months after he's been promised it. Also, if the hobbyist attempts to take advantage of the "guaranteed" maintenance, he may wait more than 6 months to get his machine back (maintenance is far less profitable than sales). Then in the midst of all of this "success" the company will renounce the hobbyists, in effect, by saying to the "real" computer community: "please don't just think of us as a hobby computer company, we're an OEM (Original Equipment Manufacturer) and have a machine that is far more than a toy for kids." It is a small wonder that the "real" computer boys don't listen or buy, especially once they've seen the logic diagrams and design characteristics.

So what causes this, and what can the hobbyist do about it? The hobbyist should recognize the fact that his money is GREEN! He pays first for what he gets; unlike many large companies who buy on purchase orders which say "you ship us a system and if after we get it we like it, we'll pay you for it in 90 days or so." Therefore, the hobbyist is well warned to carefully evaluate these systems and the quality of the company before he sends money. Use guaranteed credit card purchases where you can; clubs can join together and buy one sample system before everyone commits his check to the company. Call the company up and ask some technical questions about the machine; with luck you may get through all of the sales people, managers, and secretaries to that one poor wretch in the back room with an MS in Computer Science a few years back who's trying to make this "turkey" work. Maybe he can, but at who's expense?

I'd appreciate anyone's comments on the above opinions. I won't mention the names of any companies or computers that fit the above description; I keep my mits out of that kind of stuff and try to concentrate on my own sphere of activities.

by Mike Hayes, P.O. Box 367, Jamul, Calif. 92035, 22 Aug. 1975

GENTLEMEN (AND ALL THE PEOPLE CONNECTED WITH THE NEWSLETTER):

REFERENCE YOUR REMARK ON PAGE 2, VOLUME 1 #9 AS TO WHAT TO DO WITH THE NEWSLETTER...

CONTINUE IT IF AT ALL POSSIBLE!!!!!!!!!!!!!!

EVEN WITH "BYTE" AND THE OTHER NEWSLETTERS AND PUBLICATIONS AVAILABLE OR SOON TO BE AVAILABLE TO THE MICRO COMPUTER COMMUNITY, THE NEWSLETTER AND ALL OF US WHO MAKE UP IT'S MEMBERSHIP REALLY NEED THIS SORT OF FORUM FOR THE EXCHANGE OF IDEAS ON HARDWARE, SOFTWARE, AND PARTS AVAILABILITY. THE MICRO - 8 NEWSLETTER IS THE FASTEST WAY I KNOW OF TO GET SYSTEM MODIFICATIONS OUT TO THOSE OF US WHO ARE USING THE VARIOUS SYSTEMS...AND I COULD GO ON AND ON WITH REASONS WHY THESE NEWSLETTERS MUST CONTINUE...EVEN IF IT MEANS INCREASING THE SUBSCRIPTION PRICES (WHICH, WITH THE PENDING POSTAL RATE INCREASES IT PROBABLY WILL). I FEEL THAT MOST OF OUR MEMBERSHIP WILL CONTINUE TO CONTRIBUTE TO THE MICRO - 8 USERS GROUP WITH NEW SOFTWARE AND HARDWARE PROJECTS EVEN THOUGH OTHER PUBLICATIONS ARE WILLING TO PAY FOR THEIR EFFORTS.

ONE OTHER THING, MOST OF THE USERS APPEAR NOT TO BE CONNECTED WITH THE COMMERCIAL COMPUTER WORLD AND I WOULD CAUTION ALL OF THEM TO REALIZE THAT IF SHIPMENTS OF SYSTEMS OR PARTS SUPPLIERS SEEM TO BE A LITTLE (READ TERRIBLY) SLOW IN DELIVERY, BECAUSE OF ECONOMIC FACTORS AND THE SUPPLY AND DEMAND FACTORS WE OPERATE UNDER IN THIS GREAT COUNTRY OF OURS THINGS JUST DON'T ALWAYS WORK OUT LIKE WE THINK THEY SHOULD. I ECHO THE EDITORIAL IN THE COMPUTER HOBBYIST NEWSLETTER OF MAY...SOMETIMES WE ARE JUST TOO QUICK TO CRITICIZE WITHOUT KNOWING THE CONDITIONS SOME OF OUR SUPPLIERS ARE OPERATING UNDER. I'M SURE THIS HOBBY IS GROWING MUCH FASTER THAN MOST OF THEM REALIZED. OR US TOO FOR THAT MATTER. JUST ANOTHER REASON FOR CONTINUING THE MICRO 8 NEWSLETTER!!!

STAY WELL,

M. DOUGLAS CALLIHAN

M. DOUGLAS CALLIHAN
R.F.D. # 1 BERKLEY ST.
BERKLEY, MASS 02780
AUGUST 26, 1975

P. S. MY WORK ON THE "PHI DECK" PROJECT HAS BEEN TEMPORARILY HALTED DUE TO "WIFEITIS"...MY WIFE HAS HAD TONS OF LITTLE PROJECTS SHE WANTED DONE THIS SUMMER...IS ANYONE ELSE WORKING ON THIS TYPE OF PROJECT FOR THE GROUP??? WE CAN'T ALL AFFORD $1,000 FLOPPY DISC SYSTEMS...

JUST RECEIVED THE SEP. ISSUE OF P.E.,AND FOUND A GOOD ARTICLE IN THE "COMPUTER BITS" SECTION. SEEMS THEY ARE PROPOSING A STANDARD TAPE SYSTEM, HOBBYIST INTERCHANGE TAPE (HIT) SYSTEM. ALTHOUGH IT IS NOT SUTABLE FOR MY OWN TAPE LIBRARY, I THINK IT WOULD BE SUTABLE FOR TAPE INTERCHANGE. THE SIMPLICITY OF THE CKT., AND THE ACCEPTANCE OF SPEED VARIATIONS, PLUS THE CIRCULATION OF THE ARTICLE, WOULD LEAD ME TO BELIEVE THAT THIS COULD BE ADOPTED AS THE UNIVERSAL INTERCHANGE SYSTEM. I SUPPORT THE SYSTEM, AND AM IN THE PROCESS OF CONSTRUCTING THE CKT. AT THIS TIME.

I JUST RECEIVED MY SECOND; 4K MEMORY BOARD FROM SOLID STATE MUSIC. THE BOARD HAS PLATED THROUGH HOLES, HAS DECODE CKT ON THE BOARD, AND USED 2102 MEMORY I.C.s I AM MODIFYING MY BOARDS TO A SAVE BANK (ONE K) CAPABILITY. ONLY ONE I.C. IS NEEDED (7430), WHICH I FOUND ROOM FOR ON THE BOARD. SCHEMATIC ENCLOSED FOR MODIFICATION. IF YOU ARE IN THE MARKET FOR MEMORY BOARDS, CHECK WITH SOLID STATE MUSIC, THE BOARDS ARE THE BEST I HAVE SEEN.

SINCE I PLAN TO MODIFY MY COMPUTER FROM TIME TO TIME, I HAVE MADE MY BOARDS CAPABLE OF BEING UNPLUGED AND TAKEN OUT OT THE COMPUTER. I HAVE ALL MY BOARDS CONNECTED BY WIRE WRAP I.C. SOCKETS, WITH WIRE WRAP WIRE AS LONG AS 30INCHES. MY COMPUTER HAS BEEN UP AND RUNNING FOR TWO MONTHS.

SSG. J.W. PIERCE
460-84-4884
178th SIG. CO.
APO NY. 09102

SINCERELY.
Jackie W. Pierce
JACKIE W. PIERCE

Sept. 5,1975.

Dear Hal & John:

I want to express my gratitude to you both for the fine job you are doing on the newsletter and to all the subscribers who have made such valuable contributions. It keeps a person's enthusiasam about three months ahead of his ability to keep pace!

I have completed the TVT-1, after many delays due to defective I.C.'s (Poly-Paks & I.E.U. both had a lot of bad ones when ordered over a year ago) My Mark-8 is more or less running; I have ordered a power supply from Grant Runyan which I hope will do the job. I finally obtained the Monitor -8 ROM from MiniMicroMart and hope to complete the UART for the TVT in the near future to allow interfacing the two. I have ordered 4 K of 2102's from Bill Godbout at his great price of $1.95 but they haven't arrived as yet.

Bill was very prompt in supplying the 8008 and I have found James to be extremely quick and efficient with good quality material. However, I am very displeased with the following companies and would appreciate any help in either obtaining shipment or receiving a refund:

Challenge Electronics, Box 3345, Whittier, CA. 90605.	A pointless auto ignition system was ordered (M.O. For $49.50 was sent on Nov. 5, 1974) Shipment not received.
Don Britton Enterprises, P.O. Box G, Waikiki, Hawaii.	Plans for a portable oscilloscope ordered, M.O. for $ 13.00 sent on March 12, 1975) Shipment not received.
Delta Electronics, Box 1, Lynn, Mass. 01903	Electronic parts ordered, M.O. for $20.00 sent on April 21, 1975. Shipment not received.
B & F Enterprises, 119 Foster St. Peabody, Mass. 01960.	Electronic parts ordered, very small portion of order received. Creditslip was returned for cash refund- No reply.

My advice to anyone contemplating ordering from these firms would be to look elsewhere. Electronics is a great hobby but a lot of the fun is lost when most of your time is spent dealing with irreputable and inefficient dealers.

Keep up the good work-we appreciate it !

Sincerely,

Don N. Morrison,
6407-150 Ave.,
Edmonton, Alberta.
T5Z 1W7

J. SCOTT WILLIAMS
P. O. Box 932
Bellingham, WA 98225

Sept 7, 1975

Dear Hal and/or John,

About what Micro-8 NL should do in the future...DON'T STOP.
At this point in time your (our?) NL is the only publication that is timely enuff to deal with "what's happening now". (That I've found, that is.)
If at some point in the future a "commercial venture" proves to be able to do the same thing, THEN is time for a review of Micro-8.
The Micro-8 NL is the only publication that I read cover-to-cover three(3) times. (TCH twice, PCC once, TIME I just skim.)

Now for the news from my end.
I received and built 3 4K RAM boards from MITS. These have 2604's (4K by 1 bit Signetic dynamic RAMS) substituted for Intel 2107's. At this point in time none of the boards work. It may be my fault, but in any case it will be my/MITS first failure as far as I'm concerned. Everthing else I've gotten from them worked(after I found my mistakes, if any).
While I was on the phone to them last week about my problem (I'm shipping them my "worst performing" 4K board tommorrow), I got a solution for a problem I was having with my MITS ACR cassette interface of getting one(1) byte of garbage as the first byte off the tape. It's caused by the UART getting one(1) bad data byte off the tape when the recorder is being stopped while reading in data. It is solved by doing a initial read from the data channel before entering the sense status loop on the flag channel. This clears the UART of the one(1) garbage byte if it exists and does no damage otherwise.
Because MITS Serial I/O board "C" (Serial TTY) send side sinks 20ma and my KSR-33 with a UCC-6 call control unit does the same on it's receive side, I modified the TTY to channel 20ma to the SIOC send loop(two(2) wires, lugs, tape,diagram included).
Ordered a VDM Video Display Modual from Processor Tech. (16 lines, by 64 characters, 1K on the board, software, $160).
I also received from MITS an 8K version of BASIC until they send me the 12K version I ordered. The documentation is GREAT. I've seen and used a few BASIC's and this one is outstanding for it's size: n dimentional arrays(for strings too!), machine language "call" feature, Boolean operations, machine level I/O, computed GOTO and GOSUB, etc., plus all the "normal" stuff.
Of course I haven't used any of these neat features yet because of my memory situation, but if they work as documented I'll be happy.
That's it from Bellingham. Please keep up the OUTSTANDING work.

Yours,

J. Scott Williams

J. Scott Williams

J. SCOTT WILLIAMS
P. O. Box 932
Bellingham, WA 98225

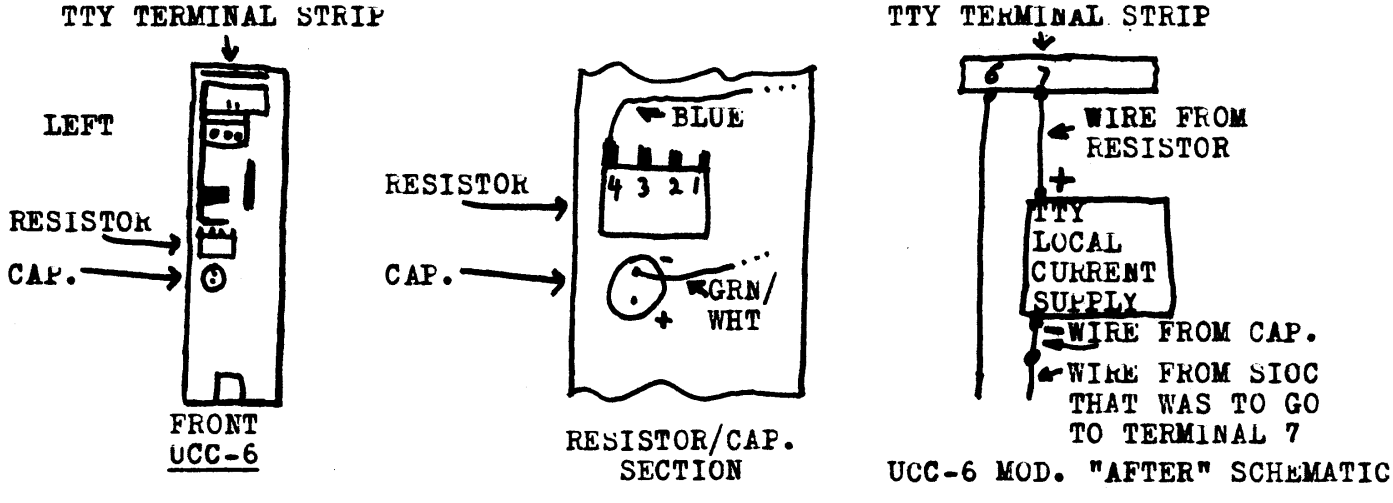
MODIFICATION OF KSR-33, UCC-6 Call Control Unit for operation with MITS 88-SIOC Serial TTY I/O board

Introduction: Because both the SIOC send and the UCC-6 receive circuits sink 20 ma for a mark, make the following electrical modifications to the UCC-6 to tap it's 20 ma local loop supply for Line operation.

INSTRUCTIONS:

1. If required, modify TTY/UCC-6 for full duplex, 20 ma operation.
2. Make connection as shown in MITS 88-SIOC documentation, except do not make the connection to termainal 7 on the TTY terminal strip.
3. Connect an additional 16" wire to the negative side of the UCC-6 filter capacitor. The cap. has a green/white wire on the neg. terminal and a green wire on the positive terminal. Connect the other end of the new wire to the lug of the wire from the SIOC that was to be connected to terminal 7 of the TTY terminal strip. After making the connection, tape it and tuck it in the corner of the TTY so conveniently provided.
4. Take another 16" piece of wire and connect it to terminal 4 of the UCC-6 current limiting resistor. This resistor is located next to the cap. mentioned in step 3. Terminal 4 of the resistor is the left hand terminal when the UCC-6 is viewed from the front. There should be a blue wire connected to terminal 4 of the resistor if the UCC-6 has been modified for 20 ma operation. Connect the new wire to the lug of the blue wire and re-connect the lug to terminal 4 of the resistor. (I pinched the bare end of the new wire between the terminal and the lug. It was a good snug fit.) Connect the other end of the new wire to terminal 7 of the TTY terminal strip.
5. Test operation by connecting the TTY to the SIOC and noting that when the TTY is switched to Line, the TTY locks up on a mark.

Postscrip: The connections I've made above may not be the best, but they are simple, easy to do and undo, and can be made without physically modifing the TTY, UCC-6 or SIOC.



Dear Hal and John,

Sep. 6, 1975

Just received the first issues of the newsletter and want to congratulate you for the great job you have done for all struggling hobbyists trying to get their systems up and running. Please don't stop. As you pointed out, new commercial ventures are appearing almost daily and everything in the field changes at a dizzying pace. To me this seems an excellent reason for a publication with no commercial ties.

I have an Altair 8800 with 2K memory (PTC) and a SWTP CT-1024 terminal. The 8800 - at the "indrotuctory" price - seemed to be a good buy and I am very satiesfied with it. I will not get into a discussion on the cost of add-ons and software offered by MITS. Enough has already been said on that subject.

Like everyone else, I have had my share of problems with the keyboard; from sticky keys to s/l/a/s/h/e/s. A software timing loop is temporarily taking care of this while I am looking for a better keyboard.

Another problem which has me baffled concerns the update rate of the display. With a simple home-brew parallel interface (8T97 enabled by address decode and OUT/WR) the maximum rate is about 60 cps. Dan Meyer at SWTP assured me that the claimed rates of 1080 or 540 can be obtained and the problem is probably in the interface. I wonder if anyone has been able to get these rates with an 8080 CPU. Bill Ames (NL #8) also mentioned the 60 cps rate with an 8008. I tried his suggestion and used IC-16, pin 9, as a "data accepted" signal without much luck. Timing differences between the 8080 and 8008? Any help would be greatly appreciated.

In the future I hope to be able to make a contribution to the newsletter. In the meantime keep up the good work.

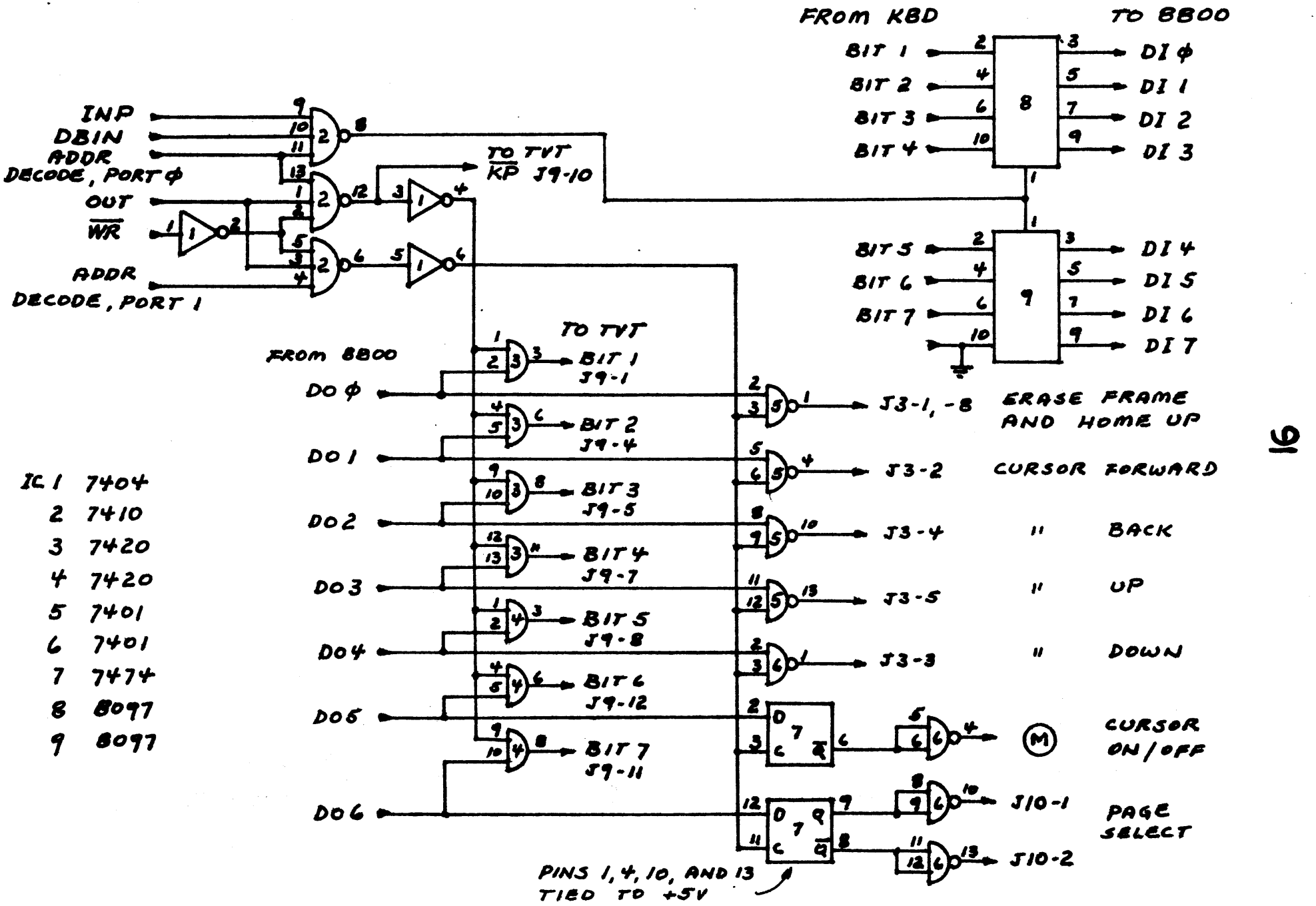
Enclosed is a schematic for a circuit I'm using to interface an 8800 with a TVT-2 and a Clare/Pendar keyboard. It was designed to be a simple an inexpensive parallel interface which also allows complete computer control of the cursor and page selection. One output port is used for character transfer and a second port for cursor control. Only a MVI and an OUT instruction is needed for all cursor functions.

All inputs are buffered with 74L04 and 7404 gates to conform to the 8800 bus loading rules. The keypressed strobe from the keyboard is connected directly to the INT line of the 8800 bus. Address decode is straight forward; the arrangement shown in NL #9 could be used. Manual control of the Erase Line, Erase Frame, and Home Up functions is still possible with separate switches to override computer control.

Bit assignments:

D0: ONE = Combined Erase Frame and Home Up
D1: ONE = Cursor Forward
D2: ONE = Cursor Back
D3: ONE = Cursor Up
D4: ONE = Cursor Down
D5: ONE = Cursor Off
ZERO = Cursor On
D6: ONE = Page 2 Select
ZERO = Page 1 Select

Adolph P. Stumpf
5639-A Ute
Glendale, AZ 85307
602-935-2053


FROM KBD
TO 8800
BIT 1
BIT 2
BIT 3
BIT 4
BIT 5
BIT 6
BIT 7
8
9
DI ϕ
DI 1
DI 2
DI 3
DI 4
DI 5
DI 6
DI 7
INP
DBIN
ADDR DECODE, PORT ϕ
OUT
WR
ADDR DECODE, PORT 1
TO TVT KP J9-10
FROM 8800
TO TVT
DO ϕ
DO 1
DO 2
DO 3
DO 4
DO 5
DO 6
BIT 1 J9-1
BIT 2 J9-4
BIT 3 J9-5
BIT 4 J9-7
BIT 5 J9-8
BIT 6 J9-12
BIT 7 J9-11
J3-1, -8
J3-2
J3-4
J3-5
J3-3
ERASE FRAME AND HOME UP
CURSOR FORWARD
" BACK
" UP
" DOWN
CURSOR ON/OFF
J10-1
J10-2
PAGE SELECT
PINS 1, 4, 10, AND 13 TIED TO +5V
IC 1 7404
2 7410
3 7420
4 7420
5 7401
6 7401
7 7474
8 8097
9 8097

BALANCING OF ROTATING MACHINERY

LASER STRUCTURAL ALIGNMENT

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PROCESS INSTRUMENTATION

STRUCTURAL RESONANCE & STABILITY STUDIES

DATA PROCESSING FOR MANUFACTURING OPERATIONS

CUSTOM COMPUTER WORK

Please run the following add in the u-8 newsletter (unless you or one of your close associates qualifies):

WANTED TO GIVE: If you were one of the lucky few who purchased a motorized card reader manufactured by RCA from Delta Electronics last fall, you probably need a case for it. I have recently rebuilt my computer system in an all-rack-mount format, and have a nice-fitting case with considerable sheet metal work invested in it. I will give this to the closest or most deserving respondent. Please reply to 601-726-5524 or Loomis Laboratories, Route 1 - Box 131, Prairie Point, Miss.

Thanks!

TELEPHONE, 601- 726-5524
LOCATED 10 MILES EAST OF MACON, MISS.
ON HWY. 14
POSTAL ADDRESS, ROUTE 1- BOX 131-A
PRAIRIE POINT, MISS. 39353

17 September, 1975

Sincerely yours,

Sumner S. Loomis

Sumner S. Loomis

August 29, 1975

Just finished up and tidied this Morse Code program. Maybe the Hams in the group can get some use out of it. It will send all of the letters and numbers, plus the following symbols: .,/-"();: Extra symbols may be added to the table easily. Cancel (ASCII 030) is used to send the eight bits for error.

Input from the keyboard is buffered. The buffer is located on page three. Since I have tape routines on the second half of that page, I limited the buffer to 128 characters. If all of page 3 is available, replace the instructions with a * by them with a NOP, and a 256 character buffer should be available. The current size of the buffer in use is displayed on the front panel LED's.

I am using port 3 for my TVT, change location 01,170 if your TVT is on a different port. Likewise, change 01,163 for the appropriate input port for your keyboard.

The keyboard should be connected to interupt the computer when a key is pressed, and the Interupt Instruction port set to LCI (026).

The speed is determined by the constant at location 1,141. The following table may be used as a guide:

Constant	Speed
010	35 wpm
012	28
014	25
016	20
020	18
023	15
026	13
035	10

Sincerely,

Bill Ames

Bill Ames
1016 Oakland, Apt. #2
Ann Arbor,
Michigan 48104

MORSE CODE PROGRAM

Notes: Buffered, 128 or 256 characters
Speed determined by constant at 01,141
Set interupt instruction port to LCI (026)

Memory Used:

Program	Page 1,	000-216 and RS-0
Char buffer	Page 3,	000-177 or 000-377 if available
ASCII-Morse table	Page 2,	000-377 (Sparse)
KBD Ptr	Page 1,	376
Send Ptr	Page 1,	377
Current Character	Page 1,	375

```
01,000 LCI 026 Clear KBD ready
   001 000 000   register
   002 LHI 056 Clear KBD ptr
   003 001 001
   004 LLI 066
   005 376 376
   006 LMC 372
   007 INL 060 Clear Send ptr

   010 LMC 372
   011 CAL 106 Check KBD
   012 160 160
   013 001 001
   014 LHI 056 Get KBD ptr
   015 001 001
   016 LLI 066
   017 376 376

   020 LAM 307
   021 INL 060
   022 SUM 227 Subtract Send ptr
  *023 NDI 044 Keep it positive
  *024 177 177
   025 OTØ 121 Show buffer size
   026 JTZ 150 If empty, try
   027 011 011   again

   030 001 001
   031 LAM 307 Buffer not empty;
   032 ADI 004   increment send
   033 001 001   ptr
  *034 NDI 044 Stay in buffer area
  *035 177 177
   036 LMA 370
   037 LLM 367 Get character to

   040 LHI 056   send next
   041 003 003
   042 LAM 307
   043 RLC 002 Form table address
   044 LHI 056
   045 002 002
   046 LLA 360
   047 LBM 317 Get bit count from
                 table

   050 INL 060 Point to Morse data
   051 LAB 301 Check for 0 bits
   052 NDA 240
   053 LAM 307 Get morse data
   054 JFZ 110 If bit count not zero,
   055 065 065   proceed to send character
   056 001 001
   057 RSO 005 Bit count zero, assume

   060 RSO 005   and send word space
   061 RSO 005
   062 JMP 104 Get next character
   063 011 011
   064 001 001
   065 LHI 056 Store current character
   066 001 001
   067 LLI 066

   070 375 375
   071 LMA 370
   072 LHI 056 Get current character
   073 001 001
   074 LLI 066
   075 375 375
   076 LAM 307
   077 RLC 002 Move next bit into carry

   100 LMA 370 Update current character
   101 JFC 100 If no carry , send DAH
   102 116 116
   103 001 001
   104 XRA 250 Send dit
   105 OT5 133 Turn on keyer
   106 RSO 005 Delay one unit
   107 LAI 006

   110 377 377
   111 OT5 133 Turn off keyer
   112 RSO 005 Delay one unit
   113 JMP 104 Proceed to next bit
   114 127 127
   115 001 001
   116 XRA 250 Send DAH
   117 OT5 133 Turn on keyer
```

```
120 RS0 005 Delay 3 units
121 RS0 005
122 RS0 005
123 LAI 006
124 377 377
125 OT5 133 Turn off keyer
126 RS0 005 Delay 1 unit
127 DCB 011 Dec. bit count

130 JFZ 104 If not done, send
131 072 072   next bit
132 001 001
133 RS0 005 Character sent,
134 RS0 005   send char. space
135 JMP 104 Get next character
136 011 011
137 001 001

140 LDI 036 Delay routine,
141 020 020   set speed
142 LEI 046
143 100 100
144 DCE 041
145 JFZ 110
146 144 144
147 001 001

150 CAL 106 Check keyboard
151 160 160
152 001 001
153 DCD 031 Check delay counter
154 JFZ 110
155 142 142
156 001 001
157 RET 007

160 INC 020 KBD test routine,
161 DCC 021   set flags on C
162 RTZ 053 If c=0, no char. entered
163 IN1 103 Key pressed, get character
164 NDI 044 Mask parity bit
165 177 177
166 LCI 026 Clear KBD ready register
167 000 000

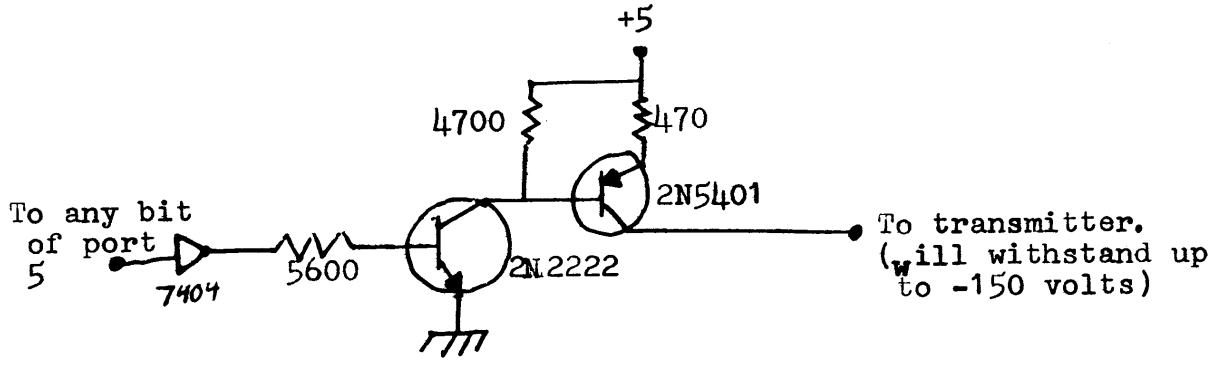
170 OT3 127 Echo character on TVT
171 CPI 074 Ignore if Line feed
172 012 012
173 RTZ 053
174 CPI 074 Ignore if Carriage return
175 015 015
176 RTZ 053
177 LHI 056 Increment KBD ptr

200 001 001
201 LLI 066
202 376 376
203 LEA 340 Save new character
204 LAM 307
205 ADI 004
206 001 001
*207 NDI 044 Stay in buffer region

*210 177 177
 211 LMA 370 Update KBD ptr.
 212 LLA 360 Get KBD ptr
 213 LHI 056 Store character in buffer
 214 003 003
 215 LME 374
 216 RET 007

RS0:  00,000 JMP 104 Jump to delay routine
      001 140 140
      002 001 001
```

Interface for grid-block keyed transmitters:



Try HAL Communications for the 2N5401 (P.O. Box 365, Urbana, Ill. 61801)

ASCII-MORSE TABLE FOR MORSE CODE PROGRAM

(Located on Page 2)

LOCATION	ASCII	LETTER	#BITS	PATTERN
202	101	A	2	200
204	102	B	4	177
206	103	C	4	120
210	104	D	3	177
212	105	E	1	333
214	106	F	4	333
216	107	G	3	044
220	110	H	4	377
222	111	I	2	377
224	112	J	4	200
226	113	K	3	100
230	114	L	4	277
232	115	M	2	000
234	116	N	2	111
236	117	O	3	000
240	120	P	4	222
242	121	Q	4	044
244	122	R	3	277
246	123	S	3	377
250	124	T	1	000
252	125	U	3	300
254	126	V	4	344
256	127	W	3	200
260	130	X	4	144
262	131	Y	4	100
264	132	Z	4	077
060	030	cancel	10(8)	377
104	042	"	6	266
120	050	(	6	111
122	051	)	6	111
130	054	,	6	060
132	055	-	5	166
134	056	.	6	250
136	057	/	5	155
164	072	:	6	034
166	073	;	6	124
176	077	?	6	314
140	060	0	5	000
142	061	1	5	200
144	062	2	5	300
146	063	3	5	340
150	064	4	5	360
152	065	5	5	377
154	066	6	5	177
156	067	7	5	077
160	070	8	5	033
162	071	9	5	011

To form table: Store number of bits at location given. Store pattern at next location.

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187 BYTES PER SECOND STANDARD (FOR 800 BITS PER INCH).

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IS THE ONLY PROPOSED ANSI STANDARD.
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CASSETTE: WILL WORK WITH MOST CASSETTE UNITS. I USE A REALISTIC (RADIO SHACK) CTR-19. TAPE SHOULD BE SCOTCH LOW-NOISE.

8 KBYTE LOAD TIME: 45 SEC @ 187 BYTES/SEC.
17 SEC @ 540 BYTES/SEC.

DEVICE-CODE SELECTED WITH DIPSWITCH.

STATUS: 4 EXTRA STATUS LINES AVAILABLE FOR INPUT.

CONTROL: 4 EXTRA CONTROL LINES AVIALABLE FOR OUTPUT, WHICH MAY BE USED TO DRIVE RELAYS FOR EXTRA CASSETTE UNITS.

COMPATIBILITY: PLUGS DIRECTLY INTO ALTAIR 8800.

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Creed type characters (now available . , @ : + * ! Ø £)
(available in 6 to 9 months ? = & % ( ) ;) each 1.00
Creed Manual - 26 pages of info on Creed, interface circuit, interface
programs for 8008 and miscelaneous info. Credit will be given for
later purchase of a Creed. POSTPAID 1.00
Paper - Pin feed on roll, $5 per roll, $50 per case of 12
Friction feed, $2 per roll, $20 per case of 12 (44 lb per case)

Paper tape winder(wind up) and 2 plastic reels - for 5 level tape-4 3/4 lb 5.00
Paper tape - Pink, green, black or buff - $.30 each or box of 10 for(10 lb)2.50
Power distribution box - includes 3 wire cord, six outlets and switch
in metal box. Wonderful for the work bench. (4 3/4 lb) 5.00
Optical Scanner for use with bar codes. Has a variety of switches,
motors, lens, photocell, power cord, etc. Includes schematic
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Power transformer(same as included in Creed interface kit)
Two secondaries - 27v and 7v - appear to be high current (4 1/2 lb) 4.00
Wire wrap boards - used, wrapped - bypass capacitors included
14 - 16 pin sockets and 21 - 14 pin sockets (unwrapped $12.50) 10.00
P. C. card with mating 62 pin socket - 4" x 6" with MDTL IC's - useful
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Front panel cards from Nuclear Data Minicomputers. Over 20 toggel switches
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RS-232 connectors, 25 pins, male or female each 1.50
Plastic case for RS-232 connector 1.00
8 conductor cable, 2 are heavy power leads per foot .10
50 feet of above cable with male RS-232 conn and case on each end(2 1/2 lb)7.00
P. C. Cards
Jim Fry's 4K 2102 board (not drilled) 10.00
Roger Smith's Baudot to ASCII and ASCII to Baudot board
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8 of these gives you a full 8 input ports for microcomputer .50
Can be used to impliment arbitrary functions
All IC's are POSTPAID
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50K trimpots - $.50 ; 1N270 $.03 ; 2N404 $.05 ; 2 section
4 position switch (miniature) with knob $.75 ; 4 section 5 position
miniature switch with knob $1.00

Include sufficient postage except where indicated postpaid(rwc 9-20-75)

I received your newsletters the other day and what a surprise, finally a publication written by the readers.

The office I work in does a great deal of data processing but we do not own or lease a computer. Everything we need done is processed by the state at a RJE terminal that has been set up in our area. The students of our district do not at this time have access to a computer, but I am working on the purchase of a Digital Equipment Corporation CLASSIC. For the price and the software available I believe this is the best system around.

I own an ALTAIR 8800 with 8K of memory, an audio cassette interface, and one parallel I/O board. Right now I do not have any software but plan to purchase the ALTAIR 8K BASIC. My computer stillhas a few bugs that I'm trying to work out with MITS. Everything went together well except the subpanel would not fit into the case when the dress panel was in place, one IC was sent with a pin missing, and the LED'S had the wrong lead cut short.

Please enter my subscription and I look forward to hearing from you.

Sincerely,

John D. Rabenaldt

John D. Rabenaldt
Assistant Data Processing Coordinator

Enclosure

ECTOR COUNTY INDEPENDENT SCHOOL DISTRICT
W. M. HOLM, SUPERINTENDENT
BOX 3912
ODESSA, TEXAS 79760

September 19,1975

I felt that I should drop you a short line to express the great joy I have always had when your Newsletter arives. You must definitely continue publication, perhaps not as much or often but still provide a voice for the hobbiest. TCH and BYTE are good but the Micro-8 Newsletter provided the only forum for communication among ourselves which allows discussing of the various suppliers. I would like to suggest a few possible changes which would lighten you load:

a) assign editors for specific topics or issues, e.g., supplier reliablity, Video displays, software availability.

b) publish only a synopsis of an available program or consturction article with the actual item available from the author for a SASE and a coping fee (very small) or available from the User Group under like conditions. While this would be inconvient for people like myself it might work out in the long run and lighten you load.

Suppliers

I have had the expected good service from both James and IEU recently but have also had very good service from MicroMiniMart on a part return which they did not have to process. I hope that my luck is an indication that they have solved their service problems.

Processor Technology 3P+S I/O Board

I constructed this board in Aug with no problems in the parallel ports. However, the UART didn't work which was probably due the reversed IC5. I noticed the contridiction in the instructions but figured the schematic would be right, a wrong guess.

I received their Software package 1 about Sept 2nd. It is excellent and after I get a Video terminal operational I will probably order it in ROM with more RAM. That free piece of software may end up being their biggest money maker.

I would like to get in contact with anyone who has constructed the VDM module.

Sincerely,

George W Rompot

George W Rompot
216 Collier Dr.
Springfield, IL 62704
23 Sep 75

MOD 8

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CANADA K6V 5Y6

(613) 342-5041

Dear Sir with regards to your August 3rd. newsletter it is my opinion that a newsletter such as yours is necessary to deseminate the truly staggering amounts of unrelated information (as an example I submit page one of your August newsletter), information which commercial magazines are unlikely to cover, so as to get this information quickly to large numbers of people. Secondly this newsletter enables people with similar intrests to contact each other, through your listings when they would otherwise would not have known of each others existance.

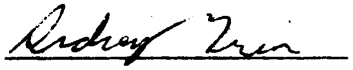
In order to facillitate program exchange I suggest that a series of compilers be written to enable (for example:) a program written for an 8080 microcomputer to be uued on an 8008, or that a series of programs be written that would take a program from one machine (say 8080) as data and convert it into a program for another machine (say 8008) as output, such a series of programs would make it easier for people owning different types of microcomputers to exchange programs.

In my last letter i expressed certain fears concerning the marketing policies of MITS which I now consider groundless due to the existance of other sources of compatiable parts.

I have a copy of a spacewar game program (thanks to Dr. Clayman of Simon Fraser University), for a Hewlett-Packhard 2115a whether it can be used on any of the existing microcomputers I don't know, but I'll send anyone who's intrested a copy including graphing subroutines. This program was used with a 64x64 point graphics display similar to the one mentioned in your newsletter as published by ECS magazine (BYTE magazine informed me that they will publish an improved version in the October edition of their magazine and that back issues of ECS are available for $ 2.50 each)

Finally I would like to thank you and all else involved for going to the trouble to produce this publication.

Sincerly Yours



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DEAR HAL AND JOHN,

I WAS GOING TO SEND YOU A WRITEUP ON HOW TO GET SURPLUS ICS OFF THE BOARDS WITH A PROPANE TORCH - UNTIL I GOT MY BYTE ≠ 1. ANYWAY, IT WORKS GREAT + I GOT SOME OF THE ALTAJ 5/$3.95 BOARDS AND HAVEN'T FOUND A BAD CHIP YET OF THOSE I'VE TESTED.

ENCLOSED IS AN AD FROM EE TIMES - THE XEROX QUALITY ISN'T TOO GOOD SO YOU MAY NOT WANT TO PRINT IT IN ITS ENTIRETY; FROM:

PACIFIC SEMICONDUCTOR, INC. (800)421-5910 TOLL-FREE
200 W. FLORENCE AVE. (213)674-9000
INGLEWOOD, CA 90301 (714)521-0990

I SENT THEM OFF AN ORDER AND GOT GOOD SERVICE - AN 8008 FOR $18.00 (NOW BACK UP TO $21.50) AND P2102-1'S AT 3.50 (NOW 4.00). THEY ALSO HAVE 2102-2'S AT 2.30 AND 2102'S AT 2.00; C-1702A'S ARE 12.00; THE 8080 IS $125.00. POSTPAID, $20.00 MINIMUM.

LET ME ADD MY VOTE TO THOSE FOR CONTINUING THE MICRO-8 NEWSLETTER. YOUR PUBLICATION HAS ABOUT THE MOST TIMELY INFORMATION AVAILABLE TO THE MICROCOMPUTER COMMUNITY AT PRESENT.

I HAVE NEARLY ALL THE PARTS FOR MY MOD-8 AND HAVE STARTED TO DESIGN A FRONT PANEL; I'D LIKE TO GET THE MMM MOD-80 CONVERSION BOARD BUT HAVE HEARD SO MANY NEGATIVE THINGS ABOUT THEM I'M HESITANT TO SEND THEM ANY CASH.

I HAVE HAD IT WITH POLY PAKS - THEIR "TESTED" SEMICONDUCTORS HAVE BEEN ROUGHLY 50 PER CENT BAD IN MY EXPERIENCE; ON MY LAST ORDER THEY SENT 10 50 OHM INSTEAD OF KILOHM TRIMPOTS. THEY NOW HAVE A FANCY FORM TO HANDLE COMPLAINTS SO THEY EVIDENTLY GET A LOT OF THEM. I GOT TWO OF THE "ASCII" GI KEYBOARD ROMS FROM B+F ENTERPRISES; AND ASCII THEY AREN'T.

I BOUGHT THE MARTIN RESEARCH BOOK AND IT'S EXCELLENT. I THINK THE SCELBI PROGRAMMING BOOK AND THE MOTOROLA 6800 APPLICATIONS MANUAL ARE ALSO WELL WORTH INVESTING IN ... I GUESS ENOUGH PEOPLE HAVE PRAISED THESE NOW THAT IT'S GETTING REPETITIOUS. EVERY TIME I READ THROUGH THE MICRO-8 NEWSLETTER I FIND SOMETHING OF INTEREST I MISSED; MAYBE YOU SHOULD EDIT THE CONTENTS AND PUBLISH IT AS THE 'MICRO-8 COOKBOOK'.

SOME FRIENDS AND I ARE THINKING OF STARTING A LOCAL CLUB - MORE DETAILS WHEN WE GET BETTER ORGANIZED.

Harold

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MICRO-8 COMPUTER USER GROUP NEWSLETTER
HAL SINGER & JOHN CRAIG -- EDITORS
CABRILLO COMPUTER CENTER
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LOMPOC, CA 93436

NOVEMBER 10, 1975
VOLUME 1, #12

WE ARE PLEASED TO MAIL YOU NL #12, THE LAST IN V 1. INCLUDED ARE 750 MORE NAMES AND ADDRESSES OF THOSE THAT HAVE CONTACTED US AND HAVE NOT SUBSCRIBED AND A ZIPCODE CROSS REFERENCE FOR THE TWO PRINTED LISTS. THE PARTICIPANT LIST IN NL #11 CAME OUT SO GOOD HALF SIZE THAT I DECIDED TO GET GREEDY AND PRINT EVERYTHING HALF SIZE IN AN EFFORT TO TRY TO GET MOST OF THE MATERIAL WAITING TO BE PRINTED INTO THIS ISSUE. PLEASE READ IT UNDER A GOOD LIGHT AND I HOPE THAT YOU AGREE THAT PACKING MORE MATERIAL IN WAS WORTH THE SMALL TYPE SIZE. WE STILL HAVE A LOT OF MATERIAL THAT SHOULD BE PRINTED AND IF WE MISSED SOMETHING OF YOURS, MANY APOLOGIES. UNFORTUNATELY, THE MOST IMPORTANT CRITERION FOR WHAT WENT IN WAS WHETHER IT WAS "CAMERA READY". IT DOESN'T COST ANY MORE TO PRINT BLACK THAN WHITE SO I WENT WILD WITH THE RAZOR BLADE TRYING TO SQUEEZE THINGS DOWN.

INCOMING LETTERS (MANY THAT HAVE BEEN PRINTED) HAVE HEAPED PRAISE ON US FOR THE NEWSLETTER. IT IS EASY TO FORGET THAT YOU AND THE REST OF THE PARTICIPANTS ARE THE ONES THAT DESERVE THE PRAISE; WE HAVE JUST PROVIDED THE PRINTING AND DISTRIBUTION PART OF THE EFFORT. LET ME PERSONNALLY THANK EVERY PARTICIPANT THAT HAS SENT IN NEWS ON BEHALF OF THE REST OF THE PARTICIPANTS. YOUR EFFORTS ARE WHAT HAS MADE THE NEWSLETTER A FASCINATING THING TO READ AND REREAD AND TO REREAD.

LET ME ALSO PERSONALLY THANK EVERYONE CONNECTED WITH THIS HOBBY COMPUTER MOVEMENT FOR ONE OF THE MOST EXCITING YEARS OF MY LIFE. EVERY DAY HAS BROUGHT A NEW SURPRISE, A PRICE BREAKTHRU, OR AVAILABILITY OF A NEW COMPONENT OR SYSTEM. IT HAS INDEED BEEN A PLEASURE TO PARTICIPATE IN A PIONEERING EFFORT THAT IS DESTINED TO RESHAPE THE DAILY LIFE OF EVERYONE IN A FEW YEARS. I'M SUFFERING FROM SHOCK RIGHT NOW TRYING TO SORT OUT THE IMPLICATIONS OF RAPIDLY DROPPING PRICES AND THE PROLIFERATION OF MICROPROCESSORS AND HOBBY SYSTEMS--AND IT LOOKS LIKE THE CONFUSION WILL GET WORSE BEFORE IT GETS BETTER.

IT IS TIME NOW FOR THE HOBBYIST TO ASK SOME VERY PRECISE QUESTIONS OF HIMSELF TO TRY TO DETERMINE WHERE HE SHOULD HEAD IN THE FUTURE. SOME OF THESE WOULD SEEM TO BE:

1) EXACTLY WHAT AM I GOING TO DO WITH THIS EXPENSIVE TOY ONCE I GET IT.
2) WHERE IS THE SOFTWARE FOR 1) GOING TO COME FROM.
3) HOW AND WHERE AM I GOING TO GET PERIPHERALS FOR THE UNIT THAT I CAN AFFORD.

YOU MAY BE INTERESTED IN THE FINANCIAL POSITION OF THE NEWSLETTER THE NEWSLETTER HAS BEEN RUN AS A CABRILLO HIGH SCHOOL STUDENT BODY ACTIVITY WITH ALL MONEY GOING INTO AND COMING OUT OF A CABRILLO COMPUTER CENTER STUDENT BODY ACCOUNT. NL'S 1-4 WERE PAID FOR IN MATH DEPT. PAPER AND ABOUT $200 WORTH OF DONATIONS FROM VERY GENEROUS PARTICIPANTS. WE ARE PRESENTLY AT THE BREAK EVEN POINT THRU NL #12 HAVING PURCHASED FOR THE COMPUTER CENTER A DURA MACH 10 SURPLUS AT $275, A MIKE-201 AT $420, 2 DOUGLAS PDP-8 INTERFACE BOARDS AT $200, AND AN ALTAIR 680 AT $310.

PRINTING 2000 11 SHEET-TWO SIDE NEWSLETTERS COLLATED COSTS $295 WITH POSTAGE RUNNING ABOUT $180 PLUS FOREIGN DELIVERY POSTAGE FOR ABOUT $500 PER ISSUE. WE HAVE ABOUT 800 COPIES OF ALL BACK ISSUES ON THE SHELF AND IF THERE IS A DEMAND FOR THESE IN THE FUTURE, A COMFORTABLE SUPPLY AND SOFTWARE BUDGET SHOULD BE AVAILABLE FOR THE COMPUTER CENTER.

I HAVE AVERAGED ABOUT 4 HOURS PER DAY, SEVEN DAYS A WEEK WORKING ON NEWSLETTER ACTIVITIES FOR THE LAST YEAR AND HAVE THOROUGHLY ENJOYED EVERY MINUTE OF IT.

THE NEWSLETTER'S FUTURE?

IT HAS BEEN DIFFICULT TO DECIDE WHAT SHOULD HAPPEN IN THE FUTURE. STRONG RESPONSE FOR CONTINUATION FOR AT LEAST A FEW MORE ISSUES HAS BEEN RECEIVED WITH ONLY A FEW NEGATIVE LETTERS. I AM WORRIED THAT THE RAPID PROLIFERATION OF LOCAL CLUBS IS GOING TO QUICKLY ELIMINATE THE NEED FOR THE TYPE OF NL WE HAVE PROVIDED BY PUTTING HOBBYISTS INTO DAY TO DAY CONTACT WITH EACH OTHER AND WITH THE INFORMATION THAT WOULD ORDINARILY GO INTO THE M-8 NL FINDING ITS WAY INTO THE LOCAL GROUP NEWSLETTERS INSTEAD.

THIS IS A NATURAL AND DESIRABLE EVOLUTION BUT WE DON'T WANT TO FIND OURSELVES IN THE POSITION OF HAVING TAKEN YOUR MONEY AND PROMISED MORE MATERIAL AND THEN FIND IT DIFFICULT TO DELIVER. IF WE WERE TO GO FOR SIX MORE ISSUES, IT WOULD SEEM THAT THE NEWSLETTER COULD PROVIDE THE FOLLOWING SERVICES:

1) TRY TO SUMMARIZE THE HOT NEWS, TIPS AND RUMORS.
2) CONTINUE TO PROVIDE READER RESPONSE ON SUPPLIERS OF COMPONENTS AND SYSTEMS AS TO THEIR RELIABILITY AND DELIVERY.
3) TO SUMMARIZE MATERIAL CONTAINED IN THE VAST NUMBER OF LOCAL GROUP NEWSLETTERS AND PROVIDE INFORMATION ON HOW TO OBTAIN COPIES WHEN YOU THINK THE MATERIAL WOULD BE VALUABLE.
4) CONTINUE TO TRY TO MAKE IT POSSIBLE FOR PRTICIPANTS TO CONTACT EACH OTHER AND FORM LOCAL GROUPS
5) TRY TO DIRECT PARTICIPANTS TO SOME OF THE GROUP PURCHASE EFFORTS BEING ORGANIZED BY THE LARGER CLUBS.
6) WHAT DO YOU THINK THE NEWSLETTER SHOULD ACCOMPLISH?

PLAN FOR THE FUTURE

WE ARE WILLING (AND HAVE RECEIVED PERMISSION FROM OUR HIGH SCHOOL PRINCIPAL) TO CONTINUE FOR SIX MORE ISSUES IN MUCH THE SAME MANNER AS BEFORE PROVIDING THERE IS A NEED. AT LEAST 350 RENEWALS AT $6.00 FOR SIX ISSUES WOULD BE NECESSARY TO GUARANTEE A BREAK EVEN ONGOING OPERATION. IF YOU WISH TO RECEIVE SIX MORE ISSUES, SEND:

1) A CHECK FOR $6.00 MADE OUT TO THE CABRILLO COMPUTER CENTER
2) A LEGAL SIZE (9"X4") SELF-ADDRESSED ENVELOPE WITH A 10 CENT STAMP.

IF AN ADEQUATE NUMBER OF RESUBSCRIPTIONS ARE RECEIVED, WE'LL SEND OUT A HOT NEWS FLYER IN THE SASE IN DECEMBER AND VOL 2, NL #1 ABOUT THE MIDDLE OF JANUARY.

IF RESPONSE IS NOT ADEQUATE TO JUSTIFY CONTINUING YOUR CHECK AND A HOT NEWS FLYER WILL BE MAILED TO YOU IN THE SASE.

NEWSLETTER SUBSCRIPTION FORM

SEND VOLUME 2, NL'S 1 THRU 6 OF THE MICRO-8 NEWSLETTER FOR $6.00 IF IT GOES. MY CHECK WILL BE RETURNED IN THE SASE ENCLOSED IF IT DOESN'T. (MAKE OUT CHECKS TO THE CABRILLO COMPUTER CENTER)

NAME

ADDRESS

ZIP

TELEPHONE #

(MAY BE PUBLISHED - LEAVE BLANK IF YOUR PREFER)

I HAVE OR AM INTERESTED IN THE FOLLOWING COMPUTERS AND PERIPHERALS:

Mail Order Firms Told to Deliver on Time, or Refund

WASHINGTON (AP)—Mail-order firms must either deliver on time or allow consumers to cancel their orders and receive a prompt refund, the Federal Trade Commission said in regulations issued Friday.

The rules, considered by the FTC for four years, cover almost the full range of goods sold by mail, including books, records, magazines, furniture, Christmas decorations and clothing. The major exceptions are seeds, plants and photo developing and processing.

For magazines, only the initial issue of a subscription is covered.

The regulations, which take effect Feb.2, 1976, place the burden for late delivery or no delivery on the multi-billion-dollar direct mail industry.

The White House consumer affairs adviser, Virginia Knauer, had estimated that 6,000 large and small mail-order firms in the United States would be affected by the regulations. They do an estimated $40 billion in business annually.

Under the regulations, a mail-order company must notify a customer if an order will be delayed beyond an advertised delivery date and provide an adequate, cost-free means, such as a prepaid postcard, to allow the consumer either to agree to a delay in delivery or to cancel the order.

The regulations provide that if the order is canceled a refund must be sent within seven days.

Firms that advertise no specific delivery date must get their product to the buyer within 30 days of receiving the order.

In testimony before the FTC, Mrs. Knauer had said that next to auto sales and repairs, mail order delivery were the biggest consumer headache for Americans.

Asked why the rules were not issued before the coming Christmas mail order rush, Joan Z. Bernstein, acting director of the FTC Bureau of Consumer Protection, said it was necessary to give companies time to adjust to the new requirements.

Mrs. Bernstein said violators of the regulations could be subject to fines of $10,000 for each day a violation is repeated.

The regulations provide that consumers who pay for mail-order products by credit card shall have refunds adjusted on their credit card records within one normal billing period.

TED SALLUME, 945 VIA FARGO, SANTA MARIA, CA 93454 (805)937-4541 SUPPLIED US WITH THIS CLIPPING FROM THE L. A. TIMES. THIS SHOULD SIMPLIFY DEALING WITH MAIL ORDER SUPPLIERS. IT MAY ALSO CUT DOWN ON THE ADS OFFERING HARD TO OBTAIN STUFF BUT ADS THAT FEATURE ITEMS THAT DON'T REALLY EXIST WE CAN DO WITHOUT.

TED IS CAREFULLY ASSEMBLING HIS SPHERE SYSTEM AND SHOULD HAVE IT FINISHED IN ANOTHER COUPLE OF WEEKS. CONTACT HIM IF YOU HAVE BEEN THINKING ABOUT PURCHASING ONE.

1) MARTIN RESEARCH IS NOW DELIVERING 4K MEMORY BOARDS AND REPORTS THAT THE MIKE 201 MANUALS WILL BE SENT OUT ABOUT NOVEMBER 25 AND THAT 8080 SYSTEMS ARE ABOUT A MONTH AWAY.

2) MANY OF US ARE GUILTY OF COMPLAINING ABOUT A COMPANY'S POOR PERFORMANCE WITHOUT HAVING WRITTEN A LETTER TO THEM COMPLAINING. THINGS GET LOST ACCIDENTALLY AND MANY TIMES A QUICK NOTE WILL ALLOW CORRECTION. WE MAY BE CHEATING SOME PEOPLE ON THEIR NEWSLETTER SUBSCRIPTION BUT IF THEY DON(T WRITE, WE'LL NEVER KNOW ABOUT IT AND WILL BE UNABLE TO CORRECT IT. THE SAME IS TRUE FOR NEARLY EVERY COMPANY. SCREAM IF YOU THINK YOU ARE HURT AND YOU MAY BE SURPRISED AT HOW MUCH ATTENTION YOU'LL GET.

3) JOE CIMMINO LET US DOWN ON THE RESULTS OF THE SURVEY HE WAS SUPPOSE TO COMPILE. NOTHING HAS BEEN RECEIVED FROM HIM. TOO BAD, IT MIGHT HAVE BEEN INTERESTING.

4) CABRILLO COMPUTER CENTER EQUIPMENT.

AFTER TWO YEARS OF PROPOSAL WRITING WE ARE NOW ANXIOUSLY AWAITING DELIVERY OF OUR 8K MEMORY ADDITIONS FOR OUR PDP-8/E AND OUR THREE DIGITAL EQUIP. CORP. CLASSICS. THESE ARE 16K PDP-8/A'S WITH DUAL FLOPPY DISKS, 60 CPS VIDEO TERMINALS, AND 45 LPM ELECTROLYTIC PRINTERS. WITH 4 PDP-8'S AN ALTAIR-680, AND A MIKE-2 RUNNING SOON AND AN 8080 SYSTEM, 2 8008 SYSTEMS AND AN 8K VARIAN 620/L TO BE FINISHED WHEN TIME PERMITS, WE MAY END UP WITH THE BEST EQUIPPED HIGH SCHOOL COMPUTER CENTER IN THE COUNTRY.

5) M&R ELECTRONIC'S ASTRAL 2000

MARTY SPERGLE OF M&R ELECTRONICS, PO BOX 1011, SUNNYVALE, CA 94080 HAS DEVELOPED AND HAS DEMONSTRATED TO THE BAY AREA HOMEBREW COMPUTER CLUB A NEW M6800 BASED SYSTEM CALLED THE ASTRAL 2000. IT FEATURES 8K OF MEMORY, SERIAL TTY I/O AND COMES READY TO RUN PLUS BASIC. IT COMES WITH A 10 AMP POWER SUPPLY, DMA, REAL TIME CLOCK, ROM AND HEX FRONT PANEL DISPLAY AND FRONT PANEL SWITCHES THAT CAN BE USED AS I/O WHILE RUNNING. PRICE WILL BE UNDER $1000 AND SHOULD BE AVAILABLE ABOUT DEC. 1975. WRITE TO MARTY FOR DETAILS.

HIS PENNYWHISTLE 103 MODEM KIT WILL APPEAR IN A NATIONAL MAGAZINE SOON AND SHOULD ALLOW YOUR COMPUTER TO TALK TO ANOTHER OVER THE TELEPHONE LINE FOR UNDER $100. MARTY ALSO SAYS HE HAS SOME HARE TO FIND KRAFT JOYSTICKS COMPLETELY ASSEMBLED THAT SHOULD BE GREAT FOR GRAPHICS TERMINALS, 91L02A (500NS) AT 8/$22, AND M6800 CPU'S FOR &52.50.

6. THE L. A. HOBBY COMPUTER GROUP (SCCS) IS WORKING ON ALL KINDS OF GROUP PURCHASES SUCH AS 8080'S ($30), JOHN BURGOON'S MEMORY BOARDS, 2102'S AND 1702A'S, ETC. AND MOST IMPORTANT, THE LSI-11 GROUP PURCHASE. LAST I HEARD, THEY TRIED TO COLLECT DEPOSITS AND HAD RECEIVED ABOUT 20 ORDERS. THEY ARE PROBABLY GETTING CLOSE TO THE 50 NECESSARY TO MAKE THE PURCHASE. IF YOU WANT AND NEED A "SERIOUS" COMPUTER, THIS IS THE WAY TO GO. THE GROUP IS BONDED SO YOU CAN SEND THEM CHECKS WITH MINIMAL WORRY AND THEY WILL TAKE BA & MASTERCHARGE IF YOU PAY THE 3% FEE. IF YOU ARE INTERESTED SEND A LARGE SASE WITH 30 CENTS WORTH OF STAMPS FOR A COMPLETE EXPLANATION OF THE LSI-11 GROUP PURCHASE TO: HAL LASHLEE, LSI GROUP PURCHASE, SCCS, PO BOX 987, SOUTH PASADENA, CA 91030 (213) 682-3108.

7) ELECTRONIC PROJECTS NEWSLETTER

IF YOU TEACH HIGH SCHOOL ELECTRONICS OR KNOW SOMEONE THAT DOES, LOOK INTO THE NEWSLETTER PUBLISHED BY ROBERT DELP ELECTRONICS, BOX 1026, FREMONT, CA 94538. IT FEATURES LOW COST CONSTRUCTION PROJECTS IN THE $5 TO $10 RANGE WITH A COMPLETE PACKET OF CONSTRUCTION INFORMATION SUPPLIED EACH MONTH FOR $10 PER YEAR.

XXX-11 NEWSLETTER

Dick Corner (514 So. 9th St., Moorhead, MN 56560) and Jim McCord (330 Vereda Legenda, Goleta, CA 93017) are going to put out a newsletter oriented toward hobbyists who have machines that use the PDP-11 instruction set. It will follow the general format of the MICRO-8 NEWSLETTER, and its primary purpose will be to promulgate news of interest to PDP-11 hobby users and to serve as a way for them to communicate with each other. It will also publish interesting and workable software and hardware ideas submitted by readers. Publication will be irregular, depending on how much good material is sent in, but we will try to get issues out every couple of months or so.

Any one interested in this newsletter should send an SASE to Dick Corner at the above address. Club memberships are encouraged as is unlimited copying -- newsletter are getting expensive. Don't send any money yet -- we won't know how much to charge until we get some idea of how large a circulation we can expect. If interest seems small we will either drop it or try to "attach" ourselves to one of the existing national newsletters. We will put out our first "issue" sometime in late October, using the SASE's. This will define our aims in more detail and will set forth some general standards for submitting material and programs for publication. Please pass this information on to anyone you know who might be interested, including any other LSI-11 buyer groups. We will send a copy to DEC in Maynard and will solicit their help.

We look forward to an interesting and exciting newsletter oriented toward this powerful minicomputer.

From JOHN CRAIG.....in San Francisco

The computer industry in this country has three focal points: Massachusetts, Southern California, and Northern California. I just finished spending 2½ years down in Orange County and it was definitely an interesting and gratifying 2½ years. But, after just six weeks in the San Francisco area I'm really amazed at the many enthusiastic people I've met and the exciting things going on here. (Someday I'll have to get to Massachusetts and see how it compares.)

Several weeks ago I attended a computer conference at the Lawrence Hall of Science, UC Berkeley. DEC, Altair, Data General, Wang, and others had displays set up for kids to play with (big & little kids). I had the opportunity to meet Dave Bunnell, editor of Altair's newsletter, COMPUTER BITS. Nice fella. In spite of all the neat displays set up the most impressive item there was a talking calculator for the blind! This unit was a sheer delight to play with, especially when you consider how it would open up a whole new world of mathematics for a blind person. Each time an entry is made the unit responds with an appropriate audio output. For example, to add 3 and 4 you press (and hear) "three plus four equals." To obtain the result a special "speak" key is depressed and you then hear, "seven point oh oh." The unit is only 7"X4½"X1½" and features memory, square root, percent, and constant functions. It is available from TELESENSORY SYSTEMS INC., 1889 Page Mill Rd., Palo Alto, Calif. 94304 for $395 (which, considering the technology that went into the development, seems quite reasonable). This price, incidentally, is available only to individual blind persons. If you know someone who is blind you might want to let them in on this. (Telesensory Systems has phamphlets in regular print and braile.)

I've also had the opportunity to spend some time at the PEOPLE'S COMPUTER COMPANY. And, they are definitely an interesting group. Bob Albrect is (among other things) showing a lot of interest in techniques for displaying brain waves on the 'ol home television set. Let your imagination loose and you can come up with several interesting applications for that.

I also attended a one day session at National Semiconductor's Microprocessor Training Center on the IMP-16 P (Prototype/development) system and PACE. National believes (and understandably so) that the power of their 16-bit microprocessors will eventually dominate the market, and they're not too worried about Intel. They also have plans to make a dent in the 8-bit market with SCAMP, which will sell for $15 in onesies and twosies.

Oops, I almost forgot a couple of items. At that Computer Conference I did encounter another very interesting item: The Cyclops Digital Camera. Applications include security systems, image recognition systems, and automated control systems. The manufacturer is also offering a controller for interfacing it to an Altair. (Camera; kit-$180, assembled-$235/Controller; kit-$260, assembled-$340) If you're interested contact the distributor: Repco, P.O. Box 4127, Mountain View, Cal. 94040 (415) 965-8581.

Bob Mullen of the People's Computer Company has developed an extender board for the Altair (and just wait til you try to fix a computer without one). He's also come up with a Relay/opto Isolator board for the Altair.

See ya back in Lompoc next time.

Richard A. Peterson, 9004 184th Ave. East, Sumner, Washington 98390, would like to see a group of hobbyist get together and build a kit based around the 8080, 6800, or IMP-16....and offer it on a non-commercial basis for cost only.

Lt. Raymond L. Buvel, PSC Box 2093, WPAFB, Ohio 45433, is planning to build his own microcomputer and peripherals such as plotter, printer and CRT (TVT ?).

Greg Lindberg, 1489 Brodiea Avenue, Ventura, California 93001, is planning to order an Altair 8800.

Mike Talbutt, Box 165, Wallonia, Indiana 47281, is currently building a TVT and plans to build a microprocessor around the Fairchild F-8 chip, and would like to get in touch with anyone else going in the same direction.

Martin J. Boyle, 1030 Milton Blvd., Rahway, New Jersey 07065, is specifically interested in a TVT.

Dale Stewart, 412 Young Place, Lakeland, Florida 33803, plans to construct an Altair within the next year. College expenses holding him back right now.

Peter Rowley, 178 Braebrook Ave., Pointe Claire, Quebec, Canada H9R 1T9, is interested in building an Altair.

Richard W. Schmidt, P.O. Box 66394, Houston, Texas 77006, is an Itty Bitty Machine assembler programmer and plans to build his own microcomputer in the future.

George Smulha, 921 W. Patterson St., Tampa, Florida 33604 is contemplating an Altair.

Dean Dillabaugh, 913 Hamlet Road, Ottawa, Ontario Canada K1G-1R3, just finished 2 years of high school courses in computer programming and is now building an 8008 based computer so that he can expand into assembly programming.

W.F. Conn, 2440-24 Ave., N.W., Calgary, Alberta T2M 2A2

Lloyd G. Oram, 568 Wallinger Ave., Kimberley, British Columbia V1A 1Z9, is a ham (VE7HH) with aspirations toward building a hobby computer as a learning tool.

Robinson C.L. Hodgkins, 915 Berkshire Rd., N.E., Atlanta, Georgia 30324, is a student at Emory University who is pretty heavy into programming. He would like to join a club in his area and is thinking about an Altair (or something else).

R.I. Johnson, Chairman, Department of Computer Science, University of North Dakota, P.O. Box 8181 University Station, Grand Forks, North Dakota 58202, says the university has recently established a computer lab and they're building a minicomputer (?).

Dr. Franz J. Frederick, Assoc. Professor, 112 Education Building, Purdue University, West Lafayette, Indiana 47907, has great plans for their newly acquired ALTAIR 8800: 1.) Control computer for experimental learning research (reading & human memory), 2.) intelligent low-cost graphics display, 3.) a stand-alone CAI system.

Roy Liggins, Department of Medical Engineering & Biophysics, Toronto General Hospital, 101 College St., Toronto, Ontario M5G 1L7

O.K., you lawyers...here's a good one: Dennis E. Faulk, Attorney at Law, 814 Main St., Canon City, Colorado 81212 (Ph: 303-275-2904), is interested in getting in touch with anyone working with an 8008 or 8080 based processor for generation of the following software: LAW OFFICE APPLICATIONS including typing, editing, word processing & storage; litigation control; indexing & retrieval of briefs, research, & internal documents and forms; cross-referencing Court Rules to statutes to cases; tickler (?) systems; remote "smart" terminal; library storage & retrieval. Whew!!

* *

You'll notice that the above entry took a total of seven lines! I thoroughly enjoyed all seven of them. I'm hoping (and so is Dennis Faulk) that there is another lawyer out there interested in developing some of that software. And, you can bet it will be to their mutual advantage to get together on the project. That, folks, is what this newsletter is all about. It truly distresses me to have nothing but a name and address to put down. If that's all we've received from you we would sure appreciate a note describing your aspirations and plans. (Don't get me wrong... we're not hurting for mail.... we just like to share these things with the rest of the world.) JTC

* *

D.J. Bannon, 1712 Santee River, Placentia, Calif. 92670, is going to get together with a friend and build and develope software for the Altair. They both have extensive hardware and software experience.

Walter H. Burkhardt, 304 Alumni Hall, Pittsburgh, Pennsylvania 15260, is another new owner of an Altair 8800. (They're going to take over the world, you know.)

Alex Brown, 143 14th #9, Seal Beach, California 90740 has something in common with Mr. Burkhardt. (Yep, an Altair.)

Frederick Staples, 6523 Avenue North, Brooklyn, N.Y. 11234, is a Communications Technician with New York Telephone and has had a long-standing interest in computers. (Believe me, Fred, you'll enjoy chasing the ones and zeros a lot more than the squigly lines -AF & RF)

Jim Pendergrass, 814 E. Ironwood Drive, Phoenix, Arizona 85020, should have received his Altair by now.

William Haddock,Jr., 1018 Briar Ridge, Houston, Texas 77027, is among the users of the 8080 chip.

David A. Busse, (whoops, no address) is a programmer working toward his Masters & has plans for building a home microprocessor.

Charles M. Phelan, 1817 N. Edgewood Terrace, Ft. Worth, Texas 76103, (Ph: 817- 534-2071) is interested in our "Altair 8800 group." He's building a TV terminal (his own design) and trying to get a very used Flexowriter working. He'll interface both with his Altair eventually.

Darrell Long, 152 Neal Drive, Richmond Hill, Ontario, Canada

Kim De Vaughn, PO Box 6706, Reno, NV 89503 is putting together a system based on the IMP-16. He feels that this chip set (with the availability of optional CROM's) is the most powerful system currently available.

Wayne L. Stork, 1035 Rota Drive, APO San Francsico 96334 has finished construction of an ALTAIR 8800 and CT 256. He now needs interface circuits and more memory. He's in the Air Force and stationed on Guam and there isn't much happening in microprocessors there.

Richard Whipple, 305 Clemson Drive, Tyler, TX 75701 and John Arnold have a floating-point package (using BCD arithmetic) and an interpreter up and running and are wondering if anyone is interested? Their cassette system is compatible with Suding's.

David W. Johnston, PO Box 3781, Washington, DC 20007 reports that MINI-Software, Inc., Box 7438, Alexandria, VA 22307 has a two-pass FORTRAN compiler which may be used in any 16K 8080 system. Floating point add time is about 2.5 ms. Write them for a price.

Fred Litton, 3618-30, Lubbock TX 79410 and John Spencer have completed an MIL Mod-8 with 2K of 1702 PROM. They plan to use it in some plan automation.

Martin J. Boyle, 1030 Milton Blvd., Rahway, NJ 07065 and his son have a working TVT-1 and they are adding a UART and scrolling and trying to decide what kind of microprocessor system to go.

Tom Schweitzer, 101 kathleen Dr. W, Syosset, NY 11791 is interested in construction of a word processing computer that would display printed text from a keyboard on a tv display. Storage of text could be done with a cassette recorder and some form of printing terminal would be needed for hard copy. He works for General Instrument as a semiconductor development engineer.

David Silacci, 1405 - 48th Avenue N.3, San Francisco, CA 94122 says his Mark-8 is up and running. David suspected that his chip was bad and contacted Paul Farr who checked out his 8008 and wet his appetite by demonstrating his equipment.

Charles Goetowski, Telemed Corp., 2345 Pembroke Ave., Hoffman Estates, IL 60172 has an Altair-8800 with 13K, SWTP CT1024, Altair cassette interface and a SWTP parallel interface for the TV. He says that if anyone needs medical computing help, they should let him know.

Tate Yoshida, 2951 S. King Drive, Chicago, IL 60616 has ordered a Martin Research Mike#2 and has also ordered the MIL Mod-8 boards and will probably put his major effort into a system based around them.

Dan Pattyn, 1212 South 6th, Bozeman, MT 59715 reports: "Glad to hear of your school boards approval of the new computer systems. The state of affairs here is most sad. A teachers strike is pending and the press leaked the news that our timeshare terminal had been used by the teacher's union to calculate salary schedules. The Computer Resource Center and its director are now embroiled in controversy. I fear the student's computing needs will be second to bruised egos. All administrative machinery has ground to a halt. It will be 6 to 8 months at a minimum before we can start looking for a new system even if the hurt egos repair themselves. Please advise others of the potential danger the word "computer" is on the 5:30 news.

Alan La Pointe, 5880 Park Avenue, Richmond, CA 94805 (415) 234-2865 says that his company is considering marketing used TTY's and similar equipment to the computer hobbyist market and will supply further details in the near future.

Dear Hal:

I would like to help form a MIKE User's Group. I have talked to Don Martin and Bob Russell of Martin Research about this and they were most cooperative. Mr. Martin considers all MIKE software to be in the public domain and plans no restriction on its distribution. (Compare that to MIT's policy!) They will offer some software on preprogrammed 1702A PROMs. They will encourage group business by offering discounts and priority service.

I have limited time and no financial resources to underwrite a MIKE User's Group. Therefore, I propose the following:

1. I will write a monthly column for distribution to the M-8 Newsletter, the San Diego club Newsletter, and any other club that wants it.

2. I will send the enclosed information packet (70+ pages) to anyone for five dollars (cost of reproduction and mailing). Any contributions you care to make will also be included at no additional charge.

I welcome your comments, suggestions, criticism, or additions. If the above seems reasonable to you, please feel free to publicize it in your next Newsletter.

I have enclosed a SASE. Could you please send me the names, addresses and/or phone numbers of anyone else you know of who is interested in forming a MIKE User's Group, as well as any MIKE owners that I could contact. I would also appreciate your comments and any information you have regarding the MIKE. Please feel free to use my name, address, and/or comments in any manner you feel will promote the formation of a MIKE User's Group.

Sincerely yours,

Jim Farschon

James W. Farschon

Mr. & Mrs. James W. Farschon
3949 Mt. Everest Blvd.
San Diego, Calif. 92111

JIM'S INFORMATION PACKET CONTAINS A WEALTH OF INFO ON HOW TO INTERFACE TO THE MIKE-2. IT INCLUDES SOME MARTIN REPRINTS, SOME INFO OF HIS OWN AND THAT HE HAS COLLECTED ON INTERFACES AND A LOT OF SOFTWARE LISTINGS. JOHN FORD AND I WILL ADD OUR INTERFACE INFO FOR THE SUDING TVT & CASSETTE, KEYBORAD, TCH CASSETTE, POP ELECTRONICS HITS CASSETTE AND CREED INTERFACE. RICHARD LERSETH CAN SUPPLY A FIFO KEYBOARD INTERFACE AND A LOT OF OTHER THINGS (HE HAS A HUGE SYSTEM RUNNING). THE MIKE-2 HAS TO BE THE EASIEST COMPUTER IN THE WORLD TO INTERFACE TO. THE TCH INTERFACE REQUIRED "NO" IC'S, ONLY A HEADER PLUG AND A DEVICE DECODE ALREADY THERE. FROM PRELIMINARY TESTS IT WORKS INCREDIBLY WELL.

Hal Singer: 19 October 1975

I've been kicking myself ever since I first got some copies of your NL. Last December I started building a Mark-8 and I got it running last July. I didn't like the way I had configuered it so I tore it apart. I'm just getting it together with a TVT and cassette recorder. The problems that I've had and the things that I've dreamed about you've already solved and built. Life would of be so much easier if I had gotten into this NL earlier.

Don't stop this NL just because BYTE is on the scene. I feel I have gained more practicle knowledge from your NL than I have from BYTE.

Perhaps I can make a contribution to your NL. In the past few years a new computer technique has been developed which is called a computer conference. In the old days a conference was announced months in advance, arrangements made, a lot of money spent, and interested poeple were brought together in one location to exchange and develope new ideas. Using computers a conference can be held between interested poeple irregardless of their location.

A computer conference consists of a computer with the conference program and interested poeple with computer terminals. Poeple communicate their ideas to the computer whcich then records their comments and transfers them to other members of the conference. For example; I could enter the first paragraph of this letter into a conference for computer hobbiest and instantly it would be available to all other poeple in the conference.

The computer conference alters the usual constraints of time and space so that it is possible for more poeple to enter into a conversation. For instance, I can enter comments to the converstion when all other members of the conference a sleeping yet the computer would provide my comments to the other members when they check in in the morning. You do not need to be physically close to carry on a converstion. On member of the conference could be in New York, another in California, and another across the hall. It makes no difference to the computer where the terminals are.

As I see it the computer conference would be an ideal mode of communication for computer freaks. Most poeple interested in this newsletter for instance, have their own computer terminal or are building one. Things happen so quickly in minicomputers that a publication can not keep up. A computer memory on the other hand can be updated almost instantly and then be ready for print out.

I guess that what I am coming to is a proposal that your NL change to a computer conference. All information submitted to you in the past is put into a computer then any member of your conference can enter new programs, projects or grips to your computer memory, and any other member could have access to this data. Aperson could keep up on computer developements simply by asking for a print out of all new discussion since such and such a date. If he was only interested in the Nark-8 he could ask for only discussion on that.

I think that a computer conference has enormous advantages over a newletter. Besides its speed a computer conference is very flexible and it can reach and interact with lagge numbers of poeple. There are things to be worked out but the computer conference will be an advance in the state of the minicomputer art in intself, and the existence of a computer conference will promote further advances in the state of the art.

Sincerely yours;
David Christianson

305 Jackson Avenue
Crookston
Minnesota 56716

Dear Hal & John,

Though we have not decided upon which computer to buy yet, we are quite serious about getting one soon. We're also rather green in this new hobby and it would probably be a riot to someone knowledgeable if they could hear us stumbling over the many terms used in this field. However, we're beginning to catch on. We've both had some limited programming experience; I with a CDC 7600 using FORTRAN; she with an IBM 370 using FORTRAN. But, it appears that much of the knowledge gained in the programming courses went in one ear ...

The AITAIR ad really caught us for awhile, that is until the brochure arrived showing the real costs involved. Dreams were shattered.

Then your newsletter arrived. Thank you very much. (Don't even consider discontinuing it!) Our hopes are alive and well again. We have some kit-building experience (Heathkit, Dynaco) so once we understand what interfacing is required, we'll be eager to begin.

We'd like to assemble a system that will allow us to use BASIC, and we'd like to use a keyboard-TV combination for I/O. A question about using a Cassette drive, will a good quality home use Hi Fidelity deck work, or must the required drive unit run at a higher speed? Also, for a system using BASIC, about how much memory is required?

We'd like to extend this hobby to the entire family, (2 children ages 7 and 9) so many of the programs we'll write will be of interest to the kids as well.

As must be painfully obvious, we have a lot to learn. We'd really appreciate any help in getting us started. What is the 8008 and the 8080? Where can we get info on it and who sells it? Some help please.

Sept 21, 1975

Chris Hovey
Det 11, ESD
APO San Fran,
Calif 96369

Sincerely,

Chris & Sandy

Gentlemen:

I just wanted you to know---I'm either a very lucky person or a super sucker. You see, I've just sent my check (don't have mastercharge) for $750.00 to Sphere Corp. for their computer with cassette interface and modem. I called Mike Wise, President of Sphere, and he seemed to have the right answers. The price is right---CPU, 5K Memory, BASIC, Keyboard, TVT (Less TV Monitor), Powersupply, and for 'Mass Storeage', a cassette modem all for (only?) $750.00. They have warranted either 60 day delivery or 5% refund which isn't half bad. I'll let you know how it all works out. At least the BBB has had no complaints, so, here's hoping I'm lucky and not a super sucker. I have already built the TVT-2 and keyboard and they both work fine. It looks like they won't be needed if the Sphere works as advertised though. I'd sell them if someone wants them. I would like to turn on some of your readers to an idea for TV monitor---Cheap! Try your local medical x-ray sales and service organization. Many of them have used, but serviceable or repairable, Video Only Monitors that while not useable to watch football, etc., are great for TV displays from a TVT. Prices range from $0.00 up, depending upon condition and how gifted the gabber. Try your x-ray department in your local hospitals too. Keep up the good work with the NL. Don't be afraid to start Volume 2 next year. Your NL is the single best publication for us Micro-8er's.

Sincerely yours,

Richard C. Creighton
1053 Princewood Dr.
Orlando, Fla. 32810

Richard C. Creighton

NEW ADDITIONS TO THE ROSTER

Since we're publishing a complete roster in this issue (name, address, phone number, etc.) only the names and comments from the newcomers will be listed below.

.....

Edward Zibulka, WBAWK, has an extensive background in commercial and ham radio and is planning to use his Mark-8 (not started yet) and the Suding TVT for ham applications. He would like to get in touch with someone in Cincinnati who has built a Mark-8.

Sidney Gogel will have his Mark-8 running soon.

Dale Morris recently purchased an Altair 8800 and got it up and running in 1 week. He discovered that the subroutine stack wouldn't hold data and therefore returned the CPU board to MITS for repair. He's very interested in 8080/Altair/peripherals information.

Charles Floto is another Altair 8800 owner and is planning to use it in word processing and typesetting. He suggests that when one hobbyist writes to another he should consider a SASE if he expects a reply.

Steve Hopkins is an Electronic Engineering student at the University of Illinois and eventually plans to build a microcomputer for use in electronic music synthesis and automatic airplane control (autopilot?).

Lewis Hamburger says it is difficult to imagine the wide interest indicated by the NL's; the subject being abstruse and difficult and also expensive.

Charles L. Sheffield is going to build an 8008 based processor. He has a "Micro-Switch" CPS RW-10357 keyboard (and needs info on it) and a TVT-1.

James E. Staber is currently assembling the Altair 8800.

David Zernoske is another 8800 owner (and if the little note was interpreted correctly he has interfaced it with a calculator).

Lawrence J. Richter has an Altair 8800 with no memory or I/O. He is building a TVT and is on the prowl for hardware and software (BASIC?? Yeah!)

Daniel J. Macero is a Professor of Chemistry at Syracuse University and recently purchased an Altair 8800. (This is beginning to sound like a broken record.... whatever became of the Mark-8??)

Arthur Brown is heavy on software development but not to much into the hardware construction area. He proposes development of an ALGOL bootstrap compiler for the 8080. If any of the Washington D.C. area members are interested he would like to perhaps work out a swap for experimental work in return for some construction (or construction help).

Peter Asch is another 8800 owner and is in need of an Assembler, memory boards, and some "prototype" PC boards that fit the 100 pin bus edge connector. (Ted Lincoln solved that problem, Pete, by scrounging up the right connectors on other boards....cutting them off...then mounting them to vector board. Works fine if you don't mind going the wire-wrap route.)

Edwin Whatley is building MP Publishing's 8008 design with a TVT console, cassette, PROM bootstrap loader, and a graphics unit. He is looking at the DATAPOINT assembler for conversion along with several other pieces of software.

Ronald Herff was commenting that the earlier newsletters didn't have much (if any) information on the 8080 and Altair 8800 (actually, he was complaining!). Well, don't worry, Ron, it looks like you won't be lacking in the future.

Richard Culbertson just completed his Altair 8800 (w/256 words) and has acquired a Remex paper tape reader (going first class, huh?). He's looking for BASIC, more memory, and some 8080 programs.

Arthur Ferguson is a mechanical engineer in a foundry and has as a hobby (and 2nd career) the servicing of 2-way radios. He has a 2nd class FCC license and is looking forward to getting into the microcomputer thing.

Jan Wilson has plans for ordering an Altair 8800 at some future date and is interested in information systems and general computer applications. (Some of the previous NL's should answer your request for a good basic introduction to micro-computers, Jan. Check out the Schelbi manual.)

Vincent Buscemi is an electronics teacher trying to keep up with the state-of-the-art by getting interested in microcomputers.

Allan W. Walker has been an electronic hobbyist for 15 years and has an M.S. in Computer Science. He has an Interdata minicomputer for his home computer (with a nice set of peripherals). He has some surplus I/O gear (paper tape readers, punches, keypunches, verifiers, etc.) which work--and at very attractive prices. Contact him for details.

Roland Lupient "was" an Altair 8800 owner. After putting it together he had to send it back to MITS (on May 22) because it didn't work, and he hasn't seen it yet. And, he hasn't seen the Comter 256 terminal which was ordered on February 25.

Steve Hopkins eventually plans to build an 8080-based computer.

Marshall Edgell is shopping around for an 8080 based kit (didn't like the MITS prices) and plans to use it for development of electronic games.

Randall Walker is working on an Altair 8800 (has the four basic PC boards). He will shortly separate from the Navy and start attending S.F. State U. and major in Business Adm (Data Processing Mgmt). He will probably join the San Francisco hobbyist group.

John Eckert is a Physicist/Manager with the Enviromental Protection Agency working with Remote Monitoring Systems. His interest lies with the National Semiconductor PACE system rather than the 8008/8080.

Andrew Woodman developed an 8080-based system from scratch with a DMA diagnostic controller. He has some interesting peripherals for sale (at very good prices); these include a Flexowriter, ½ in. 2-track servo-controlled tape transports, two 2-track cassette, and some 2548's and 1101's. Write for details.

Oh, and here's a late one... (about two months late). Don Kelton recently came out to California from New York to attend a software course on the Varian V-70 Systems. As is often the case these days he wound up spending as much time discussing the Mark-8 as the V-70. Don has a Varian 620-L as a home computer and also has (get this!) a Bendix G-15 computer (circa late '50s) in storage in California, which he would like to sell for $2500. The computer is fully operational, has extensive software, manuals, flexowriter and other peripherals.

Mark Stieglitz has (I think) an Altair 8800 and has just recently completed a TVT.

John Zarrella is very interested in starting a computer program at his local high school and/or college.

Joseph Chalala points out that 2 of the diodes shown in the power supplies on page 55 (of NL ?) are shown reversed. The lower diode in both the +5 and -9 supplies. He also highly recommends Altaj Electronics (see ad in P.E.), and SD Sales Co. in Dallas Texas.

Mark Gang is a systems programmer and EE. He has completed construction of the TVT and has just about decided to go with the Motorola MC6800 rather than the 8080. He would like to get in touch with anyone else who is going this route. (We're certainly not pushing any particular type of microcomputer, Mark, but you -and others- should keep in mind that the bulk of software developed by hobbyist over the next few years for the home computer will be for the 8008/8080. And, after this thing really gets going the exchanging of that software should develope into a lot of activity. We hope.)

And...speaking of the MC6800....David W. Johnston mentions an ad he saw in the May Microcomputer Digest (P.O. Box 1167, Cupertino CA 95014) for a $300 microcomputer kit built around the MC6800. It contains two MCM6810L1 1K RAMS, an 8K ROM, 2 peripheral interface adapters, and an asynchronous communications interface adapter. No address given, but the kit is designated as MEK6800KI Design Package. Sounds like quite a deal.

Tom Earp (212 So. Adams St., Glendale CA 91205 - PH: (213) 242-7953) is an electronic engineer who recently attended the Varian V-70 Systems Maintenance course and was introduced to the Mark-8. He's going to begin construction shortly, and also has plans to move down into "computer land" (Orange County).

Robert Emerson has an XLO 8-bit mini with an ASR-33/TVT/& cassette. He is currently working on developing an assembler and utility programs. Would like to locate an affordable disc drive (wouldn't a lot of us).

George Siverts says that his group is using a microcomputer in developing an automated instruction lab for retarded children.

John Martin will be a senior at Fairmont High School next fall and he is already deep into electronics and computers. He is constructing an Altair 8800 and has completed a TVT. He, like most 8800 owners, is now hot after some inexpensive peripherals. We're keeping our eyes open for them, John, and trying to encourage the people capable of developing them to do so.

Mel Lehr will be building an 8080-based system in the future.

Richard Hwang is a hardware designer who is seriously looking over all of the available kits and evaluating them before making the plunge.

Robert Frazier is also planning to go the Altair 8800 route with a TVT from SWTP (he speaks highly of them from previous projects). -SouthWest Technical Products-

Randall Webb is a junior at UCSB studying EE & Computer Science. He built an Altair 8800 from a kit, had to send it back to MITs to get it going properly (bad IC), and everything is fine now. He doesn't plan to go back to MITS for the peripherals because of the prices (and he isn't alone there).

Dan Soldahl has just recently finished construction of his Altair 8800. He hasn't been exactly tickled with the service from MITS (delayed shipments & missing parts). He plans to use the computer for inventory control (at the warehouse he works in) and would like to get in touch with anyone who has had any experience with the MITS floppy disc.

Hugh Barth is a Mark-8 man! Wow, the way things have been going for the last three pages we were getting a little worried that there were any left! He is completing a vector interrupt system (w/highest priority lock-out) and an indexed jump feature (plans for which he will supply at a later date). He speaks very highly of the Scelbi manual "Machine Language Programming of the 8008."

Marvin Good reports that he encountered only minor mechanical problems in putting together his Altair 8800 (missing screws) but, because of costs, he is looking elsewhere for peripherals. He says that the zener regulators for the +12 & -5v were getting hot enough to "fry eggs." He cured the problem by raising the -5 bias resistor from 220 ohms to 820 and installing a +12v regulator (National LM 340T-12) in place of the 33 ohm resistor and 12v zener.

Gregory Lincavage is studying electronic technology thru CREI and will very likely branch into the computer training. He is a chess fanatic and has high hopes for someday being able to run a chess program on his home computer.

Richard Schultz plans to build the MIL microcomputer and will interface it to a TVT and a CREED TTY & cassette.

Roger Mikel reports that Pacific Semiconductors Inc., 200 W. Florence Ave., Inglewood CA 90301 (Ph: 1-800-421-5910 & ask for Don Smith) is a good place to do business with.

Forrest Duston is another 8800 owner and is building his own version of the TVT.

Clifford Zimmerman is interested in building an 8008 system and was told by the Digital Group that it would be a good idea to contact us before beginning construction.

Steve Fischer has an 8800 and is looking forward to acquiring and running BASIC on it.

Edgar Crisostomo is currently constructing a minicomputer of his own design.

John Arnold and Richard Whipple are math/physics teachers (Jr. College & High School) putting forth a joint effort in the construction of an Altair 8800. Dick has rented a pair of lines from Ma Bell so that he can operate from his home using a Model 15 TTY. The computer has 9K of memory w/a Model 19 TTY for on-site I/O. They have the monitor up and are working on an assembler. (You are aware of the fact that Intel has an assembler for the 8080?) They speak highly of the quality of the MITS kit but had some complaints on delivery.

Ed Lankford has a Mark-8 w/1K of 1101 memory and TVT. Next step is a cassette interface. (Incidently, he has a 370/155 w/a megabyte of memory at the office.)

Marlowe Cassetti has an operational Mark-8 with a TVT II. He is currently at work on the development of a cassette system.

G.L. Thrower has just completed assembly of an 8800 and has a Mark-8 kit on the shelf waiting for him to get to it. (Und vot you goin' do vid two of dem?)

William Precht is a Data Processing Consultant (with his own firm) and has just ordered an Altair 8800 (for pleasure or business or both?).

Dr. Anthony Mowak would like to get into some hardware related to his professional efforts (automation of analytical instrumentation) and also TV games for fun.

Harold Melanson recently ordered the MIL MOD - 8 boards and plans to upgrade it to an 8080 w/MiniMicro Mart's board. Comments on suppliers: "I've had good luck with Babylon, Valu-pak, James, Epic, Ancrona Corp., IEU (some bad IC's), Altaj, Godbout (double replacements for defective IC's). Poly-paks is iffy - had a lot of bad IC's & semiconductors from them & specs seem generally poor." Harold is an EE with several years experience on large CDC systems.

Chris Roth has been in the applications programming and system analysis end of the business for about 6 years and is now looking forward to an Altair 8800 so he can finally get down to the nuts and bolts and find out what makes these things tick. He's interested in games, household accounting, and using the computer as a general learning tool.

Mark Barker (K3RZG/2) is an IBM 360 type who hopes to get into building a micro soon.

Lawrence Miller is a member of the "Mid-Michigan Micro Users Group" which was (or will be) started by Bill Serviss. He has a Mark-8 which died - and has hopefully been reborn as of this printing.

Billy Pettit has been working on a home-brew 12 bitter for some time but has dropped that in favor of a Mark-8 (and he also has the boards for a Mod-8).

Jack Abbott is a senior engineering student building a PDP-11/35 or 40 comparable minicomputer as a project. (Why don't you build a neat front panel, Jack, and then put an LSI-11 behind it? Nobody will ever know - - unless they look, of course.) Anyway, Jack is interested in the common ground we all share in the quest for peripherals and the interchange of software (he will be simulating the 8008/8080 thru software - or emulation with firmware- when his machine is finished).

Neil Colvin goes first class. He has an Altair 8800 with 12K of memory, RS232 interface, Audio Cassette interface, and also the Assembler, Monitor, & 8K BASIC. He assembled the Altair in one weekend, and it worked fine the first time power was applied.

Fritz Roth is assembling a MIL MOD-8 (w/front panel).

Brice Hawley is currently in the design stages of building a 24-bit machine from scratch.

Brother Thomas McGahee is currently building a MOD-8 with a TVT of his own design. He has taught computer/electronic courses in a tech school using DEC equipment & is looking forward to the 8008/8080 programming (and, would like to see a BASIC for the 8008....as would an awful lot of other 8008 users).

James Willis is constructing a Mark-8 now & plans to build an Altair 8800 in the future.

Tom Scarpa has "constructed an 8008 microcomputer."

Hugh Barth Jr. is another Mark-8/TVT owner.

Walter Park has built the RGS 8008 system with 1K of MOS memory.

Owen McMahon has a Mark-8 and is in need of some software (Assembler, BASIC, etc.).

* * *

Paul Gumerman (Ph: -302-475-8007) has an RPC-4000 computer system for sale. It has 8K of 32 bit words, a drum, paper tape reader/punch (60 & 30 cps), and a lot of software (including Fortran and an assembler). $800.00.

//

We've received a rather overwhelming response from the letter published in the "Computer Bits" column of Popular Electronics (June 75). The pile of letters is almost FIVE inches high! The letters seem to fall into three major catagories; 1) people who own or are in the process of building an Altair 8800, 2) those interested in building an 8800 or other microcomputer, 3) and those who just sent in their names and addresses.

Because of the great volumn we're going to just list the names (& pertinent comments) for each catagory. (NOTE: several people have indicated they would appreciate receiving some assistance and/or help in programming, construction, or just fundamentals. These people have been flagged with an asterisk next to their name. If you find one that lives in your area, give him a hand if you can.)

ALTAIR 8800 OWNERS

Ronald Tsubota - E.E. student
*Curtis Young - needs software help
Donald R. Hooker
Milton Gimenes - ham station (RTTY & SSTV)
J.M. Beggs - needs IBM Selectric interface help
Leo Edmond Cloutier
Robert Arnstein
T.H. Hsu
George Brussells
Paul Davis - turned on by his new toy!

ALTAIR 8800 OWNERS (cont'd)

John R. Lynch, Sr.
Allan Rein, M.D.
*DeWitt Hadnot, Jr.
Peter Tarca
P. F. Langlois
Jay Olson
Richard Miller - lookin' for BASIC
Joel Granick
Arnold Huge - music applications & waveform generator
Richard Dallara
Demo Agoris - says the MITS periphs are too slow & too expensive
Forrest Duston
Svein E. Mikkelsen - loves his 8800
Randall Webb
John L. Wheeler
David Lank
*Jack Maley - still blowing fuses?
H.S. Neilinger
John L. Dubois, Ph.D.
Lyle C. May
James H. Nestor, Assoc. Professor - Education-oriented software development & exchange of programs
*J.A. O'kavage - can't get it going
Fred Petterson
Gerard Bilodeau
Ron Estes
Charles McKinnon, Jr.
Alfred Buell
Marshall Losee
M.D. Rivers
Grant Johnson
Jay Woods
John Yerxa
Louis Wheeler - professional programmer (possible contributions for SM6800 µprocessor also)
Dennis Moore
Charles Shellhamer
James Staber
G.L. Thrower
Jack Coats, Jr. - has developed a Multi-task exec for 8800 which needs real-time clock
David Zernoske
Gary Tack
Fred Altman
Lawrence J. Richter
David O. Valliere - Chemical eng., has PC brd etching facilities / also plans to develope 8008/8080 simulator for PDP-8 & 11
Jim Willmore
Robert Huston
Joseph Sanger - has B.S.E.E. & is currently med student
Wayne Green - Editor/Publisher 73 magazine
Frederick A. Ball
John H. Smith, Jr., M.D.
Mark Stieglitz - has 16K of core memory w/TVT & lookin' for BASIC
Scott J. Craig - E.E. student
Dennis P. Dupre
Keith L Kendall
Steve Grumette
Ronald L. Herff - small business software development
Frank Rivera
Richard E. Ulmer, Jr.
David L. Jaffe
Mike Bennett - research math section, Gerber Products
Vern Muhr - can offer a PROM programming service
John Sommer
Thomas C. Stowe - small business software development for a client
Randy Kelsey
Randall Walker
Chris Leach
Jan Persson
Irwin A. Danto
Neil Lash - Electronics Dept., Broward Community College
A.J. Keck
Kenneth A. Hensey
Rex Wolfe - numerical algorithms development
Joseph Schwarz
Clifford H. Fusk
Murray Shevick, M.D. - interested in developing software for ECG storage & processing, etc.
William Henry - represents an Altair users group
Michael Sereg
S.M. Herbage
Joseph Dworzan
Robert Bailey
Howe C. Fong
Grayson Evans - School of Information & Computer Science (building an 8080 based computer)

INTERESTED IN AN ALTAIR 8800 (or other microcomputer):

Carl Gieseke
Dale Chapman
*Gerold S. Kerlin
David A. Foley
Marshall H. Edgell
2nd Lt. Robert Frazier - has B.A. in Math & Computer Science
Irl Yeo
Foy Willson - head of Electronics Dept. at Lenoir Comm. College
Glenber L. Hinkle
Michael B. Lamberton
Wayne Wenzlaff - interested in inventory & stock movement control
Calvin M. Osborne
John Witunsky
Charles A. Vigh
Andrew Stangel - is a computer sci student trying to convince the faculty that an Altair would be a worthwhile school project ...he needs some help (MITS, are you there?)
Joseph P. Chalala - long on hardware ability, short on software
ET-1 Jeff Hardy
Harris G. Allen
J.L. Hayward
M. Douglas Callihan
Robert H Ahlers, Jr.
Richard Petersen
Levello Haynes
Robert E. Emerson - has an XLO minicomputer (vot is dat?)
Reed E. Phillips, M.D.
Jonathan M. Prigot
Bruce Anderson - (you bet it'll make a good hobby, Bruce!)
Jerry Fife
Thomas E. Reed - engineer/hobbyist
Michael Strong - E.E. interested in T.V. & motion picture applications (film cataloguing, etc.)
Fielding S. Ellis - heavy in programming experience
H.A. Ashdon, USCG - has over-all responsibility for the Navigational Buoy "Boston", which is an impressive electronic monster which recently replaced CG Light Ship Boston & a crew of 16
Bob Phillips (WN7BIR) - interested in ADC & DAC applications with a video synthesizer/processor
John Zarrella
Steve Hopkins
Sheridan George
C. Adrian Shamblin - is a "½ systems programmer" and "½ programmer/analyst" (and that makes a whole what??)
Richard Chen - says he'll probably get the 8008 so he can keep up with our group (wait til he reads this NL!)
David Price
W. Michael Shebesta - an accountant interested in business systems programs
Elwood N. Bemis, Jr. - will be working toward computer-generated imagery on TV or Oscope
Thomas Hostetler - an amateur astrologer who will be putting together a system to calculate astrological charts to the second of a degree
Gary Sandahl
Steve Savin
John S. Arrington
William Kelley
*Robert L. Ruyle - a television camera engineer
Grant C. Schafer
Michael J. Cykana
Gary Walker - prof. programmer interested in small business, games, and etc. programming
Harold Melanson
Roger Behrns
Charles Heick
Nils James Carlson
Gerald Chapman
James M. Keller - Mathematician/physicist
Roger Rusch - Comp Sci/Math student at Southern Illinois U.
Charles H. Aldrich III

If you didn't find your name listed in the previous pages....it's because the guy doing the typing couldn't decipher your signature. If you haven't written in telling us what your future plans are, then by all means do so. Somebody else might be working in the same area, and you can help him or visa versa. And, that's what this newsletter is all about, folks.

Thank you

R.O. Whitaker (ROWCO Engineering Co.) has acquired an Altair 8800 kit which will be used as a translator within a new type of keypunch system. The unit will have a ten key combinational keyboard generating a new code called "ROWCODE." The Altair will be used for translating from ASCII, EBCDIC, Hollerith, or any other code. A floppy disc and CRT will also be interfaced to the system. Mr. Whitaker's phone # is: ⅃\Δ _/\Δ⅃Λ∠

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<u>NOTE</u>: If any of you commercial users of the 8080 come up with interface designs which could be released thru this newsletter....there are one heck of a lot of hobbyist out there just crying for that kind of help. O.K.?

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<u>INTERESTED IN AN ALTAIR 8800 (or other microcomputer)</u>:

Vince Vigus - 8008 (Mark-8?)
Terry McCarty - WA5NTI/4 - Works for the Army's Computer Performance Evaluation Group
Mark Gordon - Computer Science student
S/Sgt. Pierre A. Lamb
*Louis Boyle - interested in automotive navigational aid applications (& has a lot of questions)
*Mark Elgin
Jim Schubert - High school student
Ken Browning - would like to get in touch w/others in the Vancouver area
John D. Withrow, Jr. - Comp Sci student at U. of N.C.
Stan Head - is a systems programmer for IBM (15 yrs) currently working with speech analysis & synthesis. Wants Altair for sensing, control, & game applications
Robert Farrell - recent graduate of U. of Michigan in Computer Engineering with emphasis on mini & micro computers
Steve McNeal - & six engineers at Cathedral Teleproductions are rarin' to go
Chris Sivertz - E.E. student at U. of British Columbia
H.W. Spence
Lewis Hamburger
L. George
Douglas Beairsto
John N. Finster
Peter A. Crill
*Charles M. Cormen
Evensen - interested in navigation & control functions aboard a commercial fishing boat
*Donald D. McIntyre
John D. Adams

\+ David MacMillan
\+ Brian C. Walsh
\+ Norman R. Buchanan - interested in a mailing list computer system (approx 60,000 names)
\+ Greg Bowman
\+ James E. Allison
\+ Neil Hansen
\+ David G. Earl
\+ Donald Sanford - interested in an inventory control & bookkeeping system for his auto parts house
\+ Martin Malone
\+ Roberto R. Denis
\+ D. Bryce
\+ Brian Maxson
\+ Derek H. Davis
\+ F. Newton Fallis - an architect interested in computer applications in his field
\+ Osvaldo Hilde
\+ Eugene B. Loop - has a familiar problem: justifying his new hobby to the "boss"
\+ M. Scott Adams (WN4KWH)
\+ Donald K. Pine, M.D., F.A.C.S.
\+ Lyle F. Mays - working toward a Ph.D. in computer science
\+ N.R. Whitehead
\+ Gary Williams - is going to build the Altair from scratch
\+ Paul Silagi
\+ Darrell Flynn
\+ Sonny Deubow
\+ Gary Buhrmaster - going with the Motorola chip
\+ Ted B. Sierad
\+ John Eckert - wondering about the NS PACE chip

John Craig recently recruited three more members during a Varian V-70 course. (Which, incidentally, is his last because John is leaving Varian to go with National Semiconductor Corporation.....and finally get home with his family.) These three gentlemen are engineers for the U.S. Navy and will be responsible for manning a mobile van which will literally plug into a warship and be able to simulate combat exercises while at dockside. They're going to build an 8008 or 8080 based system as a group project with each one taking a particular section to build.

John T. Soppeland	James V. Ursin, Jr.	Ed Moyle
250 E. Pleasant Valley Rd. 102	1534 Thrush Ave.	P.O. Box 219
Oxnard, Calif. 93030	Ventura, Calif. 93003	Port Hueneme, Calif. 93041

September 15, 1975

37 Eighth Avenue
Brooklyn, N.Y. 11217

Dear Hal,

This letter is to cast my vote for you and John Craig continuing to publish the Micro-8 User Group Newsletter. If necessary, I am willing to pay a substantially higher subscription.

My reason for voting Yes is that I am about as ignorant as one can get regarding computer hardware. I am at the mercy of the last stimulating article or advertisement that catches my eye, and I say"Hot dog, that's for me!" without really knowing what I am spending my money on.

I suppose the appearance of BYTE has made you wonder whether there is still a reason for you to continue publishing the Newsletter. I would say yes. The articles in BYTE may be a hobbyist's dream--accurate, complete, up-to-date, and just what he want's to know--but BYTE is still a commercial publication and the publisher would not dream of knocking an advertiser or potential advertiser, nor would he dream of comparing products and say that item A is better than item B. I note, for example, in issue 2 of BYTE, that the Publisher himself went around the country visiting potential advertisers and he couldn't have had a more wonderful time or met a more wonderful bunch of fellows, all of whom were doing wonderful work.

Now that I've cast my vote for your continuing to slave away for my benefit, I'll tell you something that I would like to see soon in the Newsletter. That is a comparative analysis of 8008, 8080, M6800, and PACE-based micro-computers. My Big Fear is that I will spend several hundred dollars--an enormous sum--on a particular system only to have the investment become obsolete within a couple of years. I want a micro-computer very much, but I can't afford to put out money every so often as if I were buying something out of Detroit.

Yours,

MK

Morris Krieger

DEAR HAL AND JOHN

1). THANK YOU BOTH VERY MUCH FOR THE LATEST ISSUE OF THE NEWSLETTER. IT IS TRUELY APPRECIATED BY ALL OF US WHO ARE STILL ACTIVE IN THE HOME-BREW OF MICRO-COMPUTING GEAR. THERE ARE ADEQUATE RESOURCES FOR THE APPLIANCE OPERATORS (ALTAIR !!) BUT YOU FELLAS ARE THE VERY BEST RESOURCE FOR THOSE OF US WHO LOOK FOR SPONTANEOUS AMATEUR ARTICLES. AT THE BOTTOM OF PAGE 2 YOU ASKED FOR COMMENTS ON THE DIRECTION THAT THE NEWSLETTER MIGHT TAKE IN THE FOLLOWING THREE ISSUES. I TALKED WITH BUD SOUTHARD IN CEDAR RAPIDS (WE ARE HAM OPERATORS) AND ASKED THAT HE ALSO SEND YOU HIS THOUGHTS AND SUPPORT.

THOSE OF US IN AMATEUR RADIO HOBBIES FOUND THAT OUR JOURNAL, - Q S T - LOST TOUCH WITH THE STATE-OF-THE ART TECHNICAL AREAS ABOUT 1965. SEVERAL OF THE HAMS ON THE EAST COAST WERE TECHNICALLY ORIENTED AND FOUND THAT Q S T AND 73 DID NOT MEET THEIR NEEDS, SO THEY PUBLISHED A MORE TIMELY MAGAZINE "HAM RADIO".

HAM RADIO MAG. HAS BEEN A WONDERFUL SUCCESS AND Q S T CONTINUES TO DECLINE OFFERING ONLY SOCIAL OR "CLUB" NEWS. I THINK THAT BYTE PROBABLY WILL OFFER GREAT TECHNICAL ARTICLES AT THE BEGINNING, BUT WITH HELMERS AND WAYNE GREEN AT THE CONTROLS I EXPECT IT WILL EVOLVE INTO ANOTHER "QST" TYPE OF PUBLICATION. SO WITH THAT IN MIND, PLEASE CONTINUE THE NEWSLETTER SO THAT WE WILL HAVE A CURRENT AND TIMELY SOURCE OF EXPERIMENTAL CIRCUITS AND INFORMATION.

I HAVE OFTEN WONDERED WHERE ALL THE "REJECTED" ARTICLES GO ? INTO THE BIT BUCKET IN THE SKY I GUESS. I MEAN, WHEN A FELLA SUBMITTS A ARTICLE THAT DOESN'T MEET THE GREEN OR HELMERS EDITORIAL STANDARD, WHAT BECOMES OF IT ?? THERE MAY BE SOME SUPER TOPICS THAT NEVER WILL BE PUBLISHED UNLESS FELLAS HAVE AN ALTERNATIVE "VOICE" THROUGH YOUR EFFORTS IN THE MICRO-8 NEWSLETTER !!!

TWO OTHER PURPOSES FOR THE FINE NEWSLETTER OCCUR TO ME; ONE IS THAT IT IS INDEED A FORUM FOR THOSE WHO WANT TO SHARE THEIR EXPERIENCES ORDERING FROM COMMERCIAL PARTS HOUSES. I HAVE PARTICULARLY EJOYED YOUR INABRIDGED TREATMENT OF MINI MICRO MART, AND MANY OF US HAVE HAD TERRIBLE RESPONSE FROM THEM. THE SECOND PURPOSE MAY BE A PLACE TO ADVERTISE OUR OWN SURPLUS - WHEN WE DON'T WANT TO WAIT FOR THREE MONTHS TO ADVERTISE IT IN THE COMMERCIAL PUBS. AND DON'T WANT TO PAY THOSE OUTRAGEOUS RATES! SO WHEN WE COME ACROSS A FEW POWERSUPPLIES OR WHATEVER - WE CAN SAY SO IN THE NEWSLETTER.

IN ADDITION, YOU OFFER THE ONLY PLACE TO GET ACQUAINTED WITH OTHER HOBBYISTS - I AM ESPECIALLY INTERESTED IN THE NEXT ISSUE WHERE YOU WILL LIST THE MEMBERS BY LOCATION (I HOPE).

2). I FINALLY PURCHASED MY FIRST COMPUTER !!!! I BOUGHT A "USED" MIKE 201 (MARTIN RESEARCH) FROM MARK CONDIC. I OWE IT ALL TO YOU GUYS BECAUSE HAD IT NOT BEEN FOR YOUR REFERENCE TO MARK IN THE NEWSLETTER (VOL 1 #7 PG 3) I WOULD HAVE NEVER KNOWN ABOUT THE EXCELLENT MIKE SERIES MICRO'S. SO THANKS TO YOU BOTH FOR POINTING TO A GUY (MARK) WHO HAS ALL THE INSIDE DOPE ON MARTIN RESEARCH AND THEIR EXCELLENT GEAR. I AM ESPECIALLY PLEASED WITH THE BUS STRUCTURE. I AM ABLE TO DECODE I/O STROBES WITH A SINGLE 74LS138 AND A COUPLE OF TRI-STATE BUFFERS. THE 50 WIRE BUS BETWEEN BOARDS IS A SUPER CONVENIENCE WHEN TESTING AND DEVELOPING NEW CIRCUITS. THE MR 8008 MANUAL IS BEYOND MY TECHNICAL LEVEL SO I WILL HAVE TO LEAVE ITS EVALUATION TO YOU FELLAS (HAR HAR). IN ANY CASE, I CAN RECOMMENT THE MIKE 20X SERIES AND MR AS A SUPER SOURCE OF MINI GEAR. THEIR PRICES ARE WELL WITHIN RANGE FOR A HOME-BREWED SYSTEM.

I WANT TO OPERATE MY UNIT ON HAM RADIO, SO I AM LOOKING FORWARD TO SOME INFORMATION FROM THE DIGITAL GROUP (WHERE ARE THEY ? GONE ON VACATION ?) . AND DID YOU SEE THAT DODD DIGITAL DESIGN (219 WAPLES PARK, FAIRFAX VA. 22030) IS OFFERING A PROGRAMMING SERVICE AS WELL AS SEVERAL NEAT SOFTWARE ITEMS. I ALSO FOUND AN ADVERTISEMENT FOR PINON ELECTRONICS IN MESA ARIZONA WHO OFFER AN AUDIO INTERFACE THAT WILL TRANSLATE MORSE CODE TO PARALLEL ASCII. YOUR READERS MIGHT BE INTERESTED IN EITHER ONE OF THOSE ALTHOUGH THEY ARE REALLY DIRECTED AT THE HAM FRATERNITY.

3). I NEED A UART INTERFACE AND DON'T SEE AMY ON THE HORIZON. IF YOU FIND ONE UNDER $100 PSE PASS IT ALONG IN THE NEWSLETTER.

4). KEEP UP THE GREAT JOB AND THERE ARE A LOT OF US OUT HERE WITH NO TIME FOR LETTERS BECAUSE WE ARE TOO BUSY BUILDING. WE DO T R U E L Y APPRECIATE YOUR EFFORTS AND WILL CONTINUE TO SUPPORT YOU WITH WHATEVER IT TAKES ($$$$$ INCLUDED).

SINCERELY

KEN

KEN HOPPER
4021 S. BOWMAN AVE.
INDIANAPOLIS, IN
46227

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Rowco Engineering Co.

4719 SQUIRE DRIVE
INDIANAPOLIS, IND. 46241
PHONE ⅃\Δ _/\ Δ⅃Λ∠

September 20, 1975

Gentlemen:

Have an Altair up and running. From a kit. Only one mistake in assembly. Two weeks to find it.

Have a ten-key combinational keyboard interfaced. As discussed in the appended reprint from EDN. Will interface a TV monitor and a tape system. Will then have a key data system. To be installed at a keypunch service.

The keyboard feeds to a parallel 8 bit IO card. Keyboard parts cost is about $25.00. We could provide plans and software at a nominal price.

Anyone interested in forming a Computer Club in the Indpls area is invited to contact the undersigned.

Yours very truly,

R.O. Whitaker

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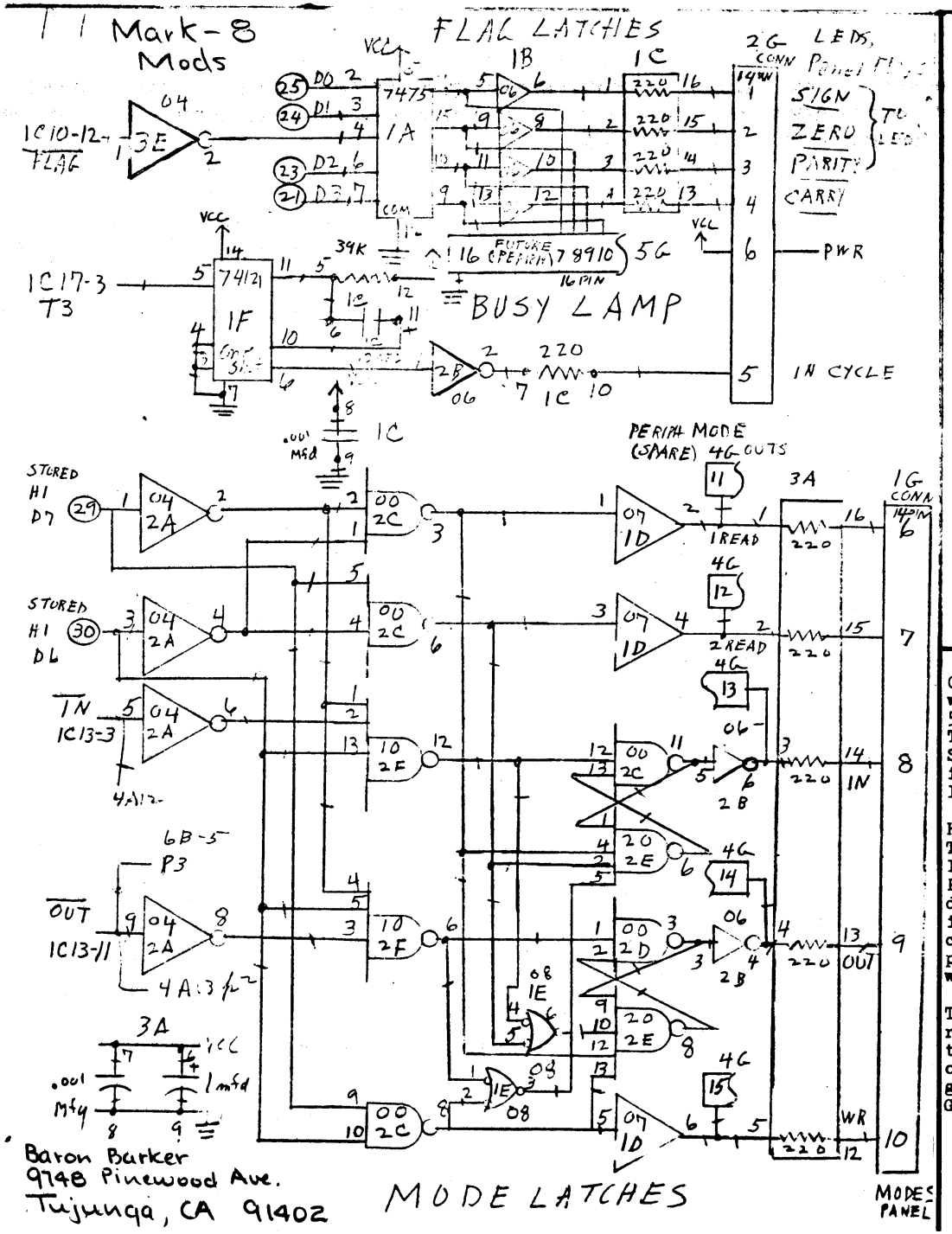


Tychon

TYCHON, Incorporated, P.O. Box 242, Blacksburg, VA. 24060
703—951-9030

Aug. 25, 1975

Dear Hal:

I have enclosed a copy of Bugbook III for you that you might like to mention to readers of the newsletter. I think that you'll find it an excellent introduction to the Intel 8080 in any configuration. Its self-teaching and lends itself to use by individual hobbyists or engineers or use as a lab manual.

E&L instruments, Inc., 61 First St., Derby, CT 06418 is selling the books at $14.95 each. We have other books in the works and will try and keep you and the Newsletter readers up-to-date. I also sent you a set of Bugbooks I and II. Please let me know if you haven't received them.

Best wishes.

Very truly yours,

Jonathan A. Titus

JAT:sjt

Grant Runyan, 1146 Nirvana Road, Santa Barbara, CA 93101 writes that he has obtained another small supply of the 5V 6amp power supplies which are so good for micro computers. These also supply 12V, 48V, and 200V each at 1 ampere. Schematics are furnished as well as instructions for obtaining -5V, -9V, and -12V. The price is $25 plus postage on 15 pounds and 6% tax in California.

He writes that he has finally been successful in making the TVT-1 into a very successful CRT terminal over the phone lines with the Santa Barbara Schools' Nova-2 and UCSB's PDP-11. What took so long getting this working was the discovery that the surplus modem had to have an inverted input before the computer would recognize that it had a customer on the line. He is preparing final plans for publication in the NL, but anyone who is interested can write for some details.

The Santa Barbara computer enthusiasts, hobbyists, and related freaks finally got together and had 45 people at their first meeting. They voted not to make a formal organization but to meet monthly to exchange ideas and get better acquainted. Local people are invited to phone Grant for the time and date of the next meeting.

MR HAL SINGER EDITOR
CABRILLO COMPUTER CENTER
4350 CONSTELLATION ROAD
LOMPOC CA 93436

DEAR HAL,

HOPE YOU WILL SERIOUSLY CONSIDER KEEPING THE NEWSLETTER ALIVE & KICKING. I HAVE BEEN WITH YOU ALMOST FROM THE START AND THERE IS NO OTHER SOURCE OF INFORMATION THAT HAS GIVEN ME AS MUCH ALL AROUND HELP & ASSISTANCE AS WELL AS BEING JUST GOOD INTERESTING READING. YOU HAVE BROUGHT AN ENTHUSIASM AND FRESHNESS TO THE LETTER THAT HAS RUBBED OFF ON ALL OF US FREAKS & THE HONEST COMMENTARY AND TELL IT LIKE IT IS ATTITUDE PUTS THE SLICKS TO SHAME AS THEY SEEM FOREVER TIED TO THEIR ADVERTISERS. THERE IS NO BETTER COMMENTARY ON THE QUALITY OF THE GROUP THAN THE CONTRIBUTORS IT ATTRACTS: TERRY RITTER - BILL SEVERANCE - PHIL MORK WILLIAM WHITE - TO NAME ONLY A FEW WHO REGULARLY COME UP WITH TERRIFIC MATERIAL. I'm SURE THAT ALL THE PARTICIPANTS WOULD BE GLAD TO COVER WHATEVER WOULD BE REQUIRED TO KEEP THE GROUP MOTIVATING. I FOR ONE AM QUITE SURE THAT MANY OF MY PROJECTS WOULD NEVER HAVE GOT OFF THE GROUND & UP AND RUNNING WITH OUT THE ADVICE AND AID OF PEOPLE WHO HAD WORKED THEIR WAY THROUGH THE SAME PROBLEMS PEOPLE LIKE JIM FRY & STEVE CIARCIA HAVE BEEN MOST GENEROUS WITH THEIR TIME & EXPERIENCE IN GETTING ME OVER THE HUMP IN DEVELOPING MEMORY AND POWER SUPPLY. EVERY REQUEST FOR HELP HAS COME UP WITH FRIENDLY KNOWLEDGEABLE SUGGESTIONS FROM MORE MEMBERS THAN I CAN NAME THOUGH I WOULD LIKE TO MENTION EACH PERSONALLY, SO AS NOT TO SLIGHT ANYBODY. YOU, YOURSELF HAVE GIVEN ME MANY HINTS AND PIECES OF MATERIAL I COULD NOT HAVE OBTAINED BY ANY OTHER METHOD

WE HAD A MEETING LAST SATURDAY OF THE CHICAGO GROUP, LARGELY MADE UP FROM NAMES OUT OF THE NEWS LETTER, WITH A VERY FINE TURNOUT. BILL PRECHT WAS LARGELY RESPONSIBLE FOR THE ARRANGENTS AND DID A FINE JOB. MADE MANY REWARDING CONNECTIONS AND PICKED UP MUCH NEEDED INFORMATION. WAS GLAD TO SEE PEOPLE LIKE BOB SWARTZ, WHO I HAD BEEN CORRESPONING WITH, AND WAS ABLE TO DISCUSS SOME OF THE FINER POINTS OF PROJECTS I'M INTO AT LENGTH. THIS IS THE KIND OF EXPERIENCE THAT IS INVALUABLE TO ANYONE NOT IN THE MAINSTREAM OF THE COMPUTERWORLD AS MOST OF THESE GUYS KNOW WHERE & HOW TO LATCH ONTO NEEDED MATERIAL AND INFORMATION. THIS IS THE AREA THAT THE NEWS LETTER EXCELLS IN ALSO, I MUST ADD. MANY OF THE ITEMS AND TID-BITS OF INFO I WOULD NEVER OF HEARD OF IF NOT FOR THE NEWSLETTER. WHILE "BYTE" IS A NICE SLICK PRESENTATION IT IS SOMEWHAT LACKING IN THIS PERSONAL TOUCH. AND R-E & P-E HAVE THEIR MOMENTS BUT AS HAS BEEN MENTIONED ARE SOMEWHAT SHALLOW IN THEIR COVERAGE TENDING TO GLOSS OVER THE TOP OF SUBJECTS THAT SHOULD BE GONE INTO IN DEPTH. THEY GET YOUR INTEREST UP WITH A LOT OF FLASH AND THEN YOU DONT GET ANY MEAT & POTATOES TO SATISFY YOUR INTEREST. I'M THINKING THAT MANY OF THE SUPPLIERS ARE OPERATING ON THIS SAME PRINCIPAL AND THIS IS TOO BAD AS THEY ARE THE ONE'S WHO COULD REALLY COME THROUGH FOR US, AND WOULD SEEM TO BE JUST GOOD BUSINESS FOR THEM. THE ONLY WAY I HAVE TO REALLY EVALUATE SOME OF THESE OFFERINGS IS FROM THE COMMENTS & CRITISM THAT PEOPLE HAVE BEEN

(3)

MAKING IN THEIR LETTERS TO YOU. AS YOU HAVE SAID MANY TIMES YOU SEND YOUR MONEY AWAY AND HOPE YOU GET WHAT YOU PAY FOR. THE MOST AGGRAVATION IS WHEN YOU GO FOR THEIR BALLY-HOO AND THEN THEY LET YOU HANG BY YOUR THUMBS FOR MONTHS WHILE THEY GET THEMSELVES TOGETHER ENOUGH TO DELIVER. I THINK GODBOUT & BURGOON ARE WISE TO WAIT UNTIL THEY ARE READY BEFORE THEY COME OUT WITH SOMETHING NEW & IT WOULD SEEM TO BE JUST GOOD PUBLIC RELATIONS ALTHOUGH I'm ANXIOUS TO SEE JUST WHAT THEY WILL COME UP WITH.

MOST OF MY SYSTEMS ARE COMING ALONG BUT I SURE WOULD LIKE TO GET OUT OF THE HARDWARE STAGE SEEMS LIKE EVERY TIME I FEEL LIKE I'M ON TOP OF IT SOMEBODY ELSE COMES UP WITH A MODIFICATION OR ENHANCEMENT THAT LOOKS SO GOOD ITS IRRESISTABLE HAVE RUN MANY SIMPLE THINGS IN THE PROCESS OF DE-BUGGING AND CANT WAIT TO REALLY GET INTO IT. STILL STRUGGLING TO BRING ALL THE BITS & PIECES INTO A COMPREHENSIVE SYSTEM. HAVE BEEN PLAGUED WITH LITTLE ODDS & ENDS OF FAILURES THAT WERE HARD TO TRACK DOWN. HAD A PROBLEM FOR WEEKS WITH THE ALTAIR PROTECT CIRCUIT AND MITS JUST ADMITTED THEY HAD A CRITICAL PIN TO +5 INSTEAD OF GROUND / PROBLEM SOLVED. TV II HAD SOME CHIPS THAT DIDN'T TAKE THE BURN-IN BUT IT IS FUNCTIONING WELL ENOUGH WITH REPLACEMENT STILL TRYING TO GET THE MARK-8 ORGANIZED WITH SUDING'S STUFF. DOCUMENTATION SLOW COMING FROM BOTH THE DIGITAL GROUP & MARRY GOLDBERG (THAT S.O.B. HAS HUNG ME UP MORE THAN ANY OTHER SUPPLIER)

(4)

BOB SWARTZ HAS GOT ME INTO THE MIL-MOD MOSTLY BECAUSE OF THE PROGRAMMER ON THE BACK-PLANE AND I SHOULD HAVE ALL THE PARTS I NEED SOON. BOB COOK STILL HAS NOT COME UP WITH THE TYPE-FACE NEEDED TO MAKE THE CREED USEFUL & I'M CONSIDERING GOING TO SOME OTHER FORM OF HARD COPY IF I CAN MAKE A CONNECTION THAT WILL NOT COST AN ARM OR A LEG. ONE OF THE GUYS AT THE MEETING JOKED THAT THE FURNITURE MONEY HAD GONE INTO COMPUTERS & I'm GETTING PRETTY CLOSE TO THAT. SURE AM GLAD TO SEE MEMORY PRICES COMING DOWN AS I CAN USE ALL I CAN GET FOR REAL TIME WAVE SHAPES. BUT ONE THING LEADS TO ANOTHER, MORE MEMORY, MORE POWER SUPPLY AND SO FORTH.

PLEASE FIND SOME WAY TO KEEP OPERATIONAL WITH THE NEWSLETTER — LOOK FORWARD TO EVERY COPY AND FIND SOMETHING REWARDING AT EACH RE-READING HOPE TO HEAR FROM YOU SOON.

YOURS TRULY

W. H. BURTNER
RR2 BOX267
VALPARAISO IND 46383

HELLO;

I READ ABOUT YOUR GROUP IN POPULAR ELECTRONICS (JUNE '75) AND WAS PLEASED TO FIND THAT THERE ARE OTHER PEOPLE INTERESTED IN BUILDING THEIR OWN COMPUTERS. I AM NOT ENTIRELY A HOBBYIST SINCE I HAVE HAD SEVERAL YEARS EXPERIENCE IN DESIGN OF LOGIC AND COMPUTER SOFTWARE. ONE OF MY PROJECTS BEING THE DESIGN OF A COMPUTER SYSTEM BASED ON THE INTEL 8080 TO BE USED IN REMOTE BATCH TERMINAL AND WORD PROCESSING SYSTEMS. I AM NOW BUILDING MY OWN SYSTEMS USING AN 8080 AND WOULD LIKE TO DETAIL SOME TECHNIQUES WHICH I AM USING.

SALIENT FEATURES ARE:

1- A STRUCTURE WHICH ALLOWS MEMORY REFERENCE OR INPUT/OUTPUT INSTRUCTIONS TO BE USED FOR I/O.

2- INTERLOCKED (HAND-SHAKING) DATA TRANSFER WITH TIMEOUT INTERUPT IF NO ACKNOWLEDGE IS RECEIVED IN 10mS.

3- MEMORY PROTECT INTERUPT IF THE STACK OVERFLOWS ~~OR~~ BELOW A PROGRAM DEFINED ADDRESS

4- MULTI-LEVEL PRIORITY INTERUPT STRUCTURE ALLOWING 16 DEVICES PER LEVEL WITHOUT NEED FOR POLLING

5- DIRECT MEMORY ACCESS CAPABILITY.

CONSOLE CAPABILITIES:

1- MEMORY OR I/O ACCESS

2- DISPLAY OF DATA AND ADDRESS

3- DISPLAY OF PROGRAM COUNTER OR STACK POINTER WITHOUT SOFTWARE ROUTINES

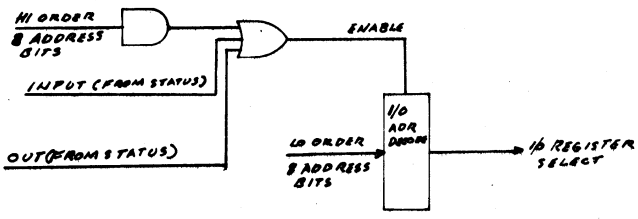
4- CYCLE STEP OR INSTRUCTION STEP

OPERATION:

WHEN M1 IS TRUE IN THE STATUS LATCH THIS INDICATES THAT AN INSTRUCTION FETCH IS TO BE EXECUTED. AT DBIN TIME THE ADDRESS ON THE BUSS MUST BY DEFINITION BE THE PROGRAM COUNTER. THIS INFORMATION IS LATCHED FOR DISPLAY.

THE STACK POINTER DISPLAY FUNCTIONS IN MUCH THE SAME MANNER EXCEPT THAT THE STACK MAY BE USED IN EITHER READ OR WRITE MODES.

MEMORY REFERENCE I/O



OPERATION:

THE TOP 256 MEMORY ADDRESSES ARE ASSIGNED AS I/O DEVICE REGISTERS. WHEN THE 8 UPPER ADDRESS BITS ARE TRUE THIS IS USED AS AN ENABLE FOR AN I/O ADDRESS TO BE DECODED, ADDITIONALLY INPUT OR OUTPUT FROM THE STATUS LATCH ARE USED AS ENABLES.

THE RESTRICTION IS THAT THE TOP 256 ADDRESS MAY NOT HAVE MEMORY.

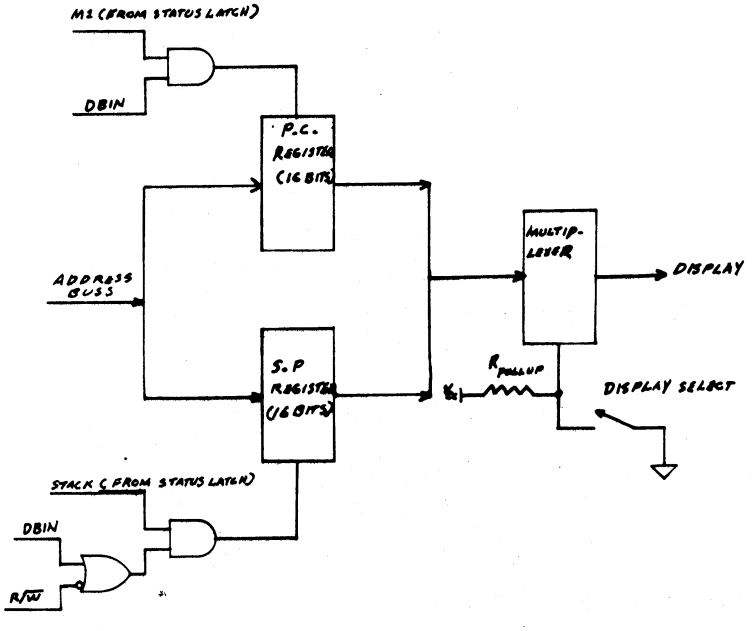
THE ADVANTAGE IS THAT ANY MEMORY REFRENCE INSTRUCTION (EG ADD M, MOV M,R) MAY ACCESS ~~AN~~ I/O. THIS IS OFTEN HANDY IN COMPLEX PROGRAMS.

5- A PROGRAM DEBUGGING TOOL WHICH IN CONCLUSION I HOPE YOU WILL FIND THESE ITEMS WILL FORCE THE PROCESSOR INTO AWAIT MODE USEFUL AND WILL GET IN TOUCH WITH ME REGARDING IF A PRESELECTED ADDRESS IS MATCHED AND MEMBERSHIP IN YOUR GROUP. MY NAME AND ADDRESS DATA IS FOUND TO MATCH A PRESELECTED COMPARE ARE BELOW.
(EG EQUAL, NOT EQUAL, GREATER, LESS, GREATER OR equal, ETC.)

I WILL NOW GIVE BLOCK DIAGRAMS OF SOME OF THESE FEATURES. THE MORE DIFFICULT TO ACHIEVE FEATURES I WILL MAKE AVAILABLE AT YOUR REQUEST ALL SHOULD BE ADAPTABLE TO THE ALTAIR.

YOURS TRULY
JOHN W. GLUCK
1010 PLESSIS APT. 1
ST. VINCENT DE PAUL, LAVAL, QUE
CANADA

STACK POINTER/PROGRAM COUNTER DISPLAY



THE NEW LISTING

Several neat new items on this listing. But first, the news; I have powered up my PDP-11/05 at last! A few bugs left to iron out but it appears to be working and almost ready. My system will consist of a PDP-11 processor with 8K of core, a 33 TTY, 2 CES tape drives, high speed paper tape reader (I need a punch, can anyone help me on this?), 2 nine track magtape drives (I need heads for these), a disk, a nice printer, a storage scope, and a plotter. Not necessarily in that order. It looks like all of that will take about a year or so.

Since last listing I' picked up some other stuff and met some more interesting people. It's really terrific to come across people that have their own computers. If you have a friend who wants to correspond about computers, let me know. I like to write letters and now since I am a part time student, I have a little more time to do it. I enjoy even more talking on the phone, but that is expensive.

Work on the CES tape standard is pretty much done. If anyone is far enough along to need it, let me know and I will send the data along for the cost of copying. There are now 24 people that I know of that have the CES drives, most have 2, some have 3 or 4. Any way, the group is growing.

Let me know what you have running, or what you have to sell, or what you need to buy. I think I can help you out a little with hardware problems. If you come accross any neat collections of computer stuff and can't afford to buy, sometimes if you tell me about it we can work out something with the other folks on my list so that you can get the item you want at a lower price.

I like to trade too, and a lot of times we can work out things so that a trade will reduce the cost of something you want.

If you have any questions about any of the items described in the listing don't hesitate to write or call.

MY NewADDRESS AND PHONE NUMBER IS:

14058 ~~14000~~ Superior Rd. Apt. 8
Cleveland, Ohio, 44116
(216)-371-9304

Gary Coleman

20 October 1975

Hi, Hal

Last Wednesday I forgot to bring you a copy of enclosed 1-page blurb I cranked out re our Santa Barbara club's 1st meeting. So here it is. There are some people that wanted to be there that couldn't make it, such as Marshall Daly (consultant & programmer), 964 2968, PO Box 3013, SB 93105--a fellow-member of the Science & Engineering Council of SB, and (Dr.) Dave Noble, Noble Electronics, Carpinteria (very capable digital and analog electronics guy, but not a software type). Bus.: 873 Linden, fone 684 2410, home: 5488 8th, fone 684 2920. And Ben Lum, of Culler-Harrison, fone at work is 968 1064, home at 6162 Braeburn Dr, Goleta, fone 967 6070. And you know Jim McCord, who will co-edit the XXX-11 newsletter.

I have over 80 names on my prospect list, and many good sources haven't been tapped, such as Burroughs, and others only superficially, such as Raytheon.

I went on a tour of Delco this afternoon, sponsored by the Sci & Eng Council, as part of the Goleta Chamber of Commerce R & D week or something, and saw some of their compact military computers. One of our members, Sue Rudnicki, programs them and also Computer Automation Alpha 16's.

Saturday I drove Kevin McLoughlin, Dana Trout, Larry Kaempf & I to the SCCS meeting at UCLA in LA. The latter 2 have sent in deposits for the LSI-11 group purchase, and Dana may, after seeing Bob Dolan's, which hasn't arrived as of Saturday. He was to get the 1st one off the Puerto Rico assembly line (its predecessors being sort of hand-made pre-production prototypes, I guess).

So far only 12 people had sent in their deposits for the LSI-11. They will wait until they get 50 before placing the order, regardless of what purchase-option people mark on those forms.

We also went to Bernie's, an electronic surplus place on Plummer, E. of de Soto, in the San Fernando Valley. Dana & Larry bought 3 power supplies like I paid Grant Runyan $25 for, but they paid $8. each. This was a 1-day sale. Saw a Typagraph (reconditioned, they said) for $700. (This is a modified ASR-33, that has a different type-cylinder, 90 characters/line, can line feed in tiny increments in either direction, and also move the type-cylinder in tiny increments left or right, all for plotting. I once (1970) tried to get a distributorship for them. They're in a nice heavy wooden enclosure, very quiet. .....Also saw some Tally 100 LPM, 5 x 7 matrix line printers for $600. Lots of other stuff.

Don Tarbell spoke at the meeting on cassette interfaces and methods of digital recording on audio tape cassette recorders. (He offers a cassette interface board for Altair 8800's for $100, you know). He says he's used his system for 4 years with great success.

Did you know that Schafer Electronics has a computer which was designed by them, and was originally intended for sale? An 8-bit machine. See Brion Johnson & Glenn McComb for information about it. I wonder how many one-only machines there are? Of course, in the early days, that was the only kind that anyone had--no two alike.

The enclosed "Datafile" was in response to a request that I prepare a list of attendees to be handed out at the next meeting (Tue 4 Nov), but I didn't want to waste all that blank space on the paper. On the other hand, I don't want to inherit a chore like yours. Besides, there must be a limit to how many newsletters we really need.

I'd like to be able to attend club meetings that offered a variety of things: Information exchange on microcomputer projects etc., which seems to be the main thing in most clubs, but also lectures by experts on things such as various commercial machines, including maxi's that we can't hope to buy or play with, such as the Cray 1 with its 12 nanosecond cycle time,,,computer architecture, languages, history.....

Nuf for now.

Doug Penrod
1445 La Cima Road
Santa Barbara, California, 93101 962 3337

Doug Penrod

Hi again: Doug Penrod

OCTOBER 1975 — DATAFILE — Volume 1 Number 0

The first meeting of the un-named club of computer hobbyists of the Santa Barbara area was held Wednesday evening at 7:30, 1975 October 8 at the Goleta Library, 500 North Fairview. Attendees ranged from professionals to those with a keen interest but no knowledge so far. Equipment ranged from abacus and slide rule to a Data General Eclipse system. Most expressed an interest in owning a machine of their own, from programmable calculator through microcomputer to minicomputer. Most felt that the most valuable feature of meetings is the "random access" period, during which members mill about and compare notes on their projects and problems, and examine hardware brought for display and consultation. At the first meeting was an HP-65 (Ralph Boland), an MITS Altair 8800 (Doug Penrod), a MITS Scientific Calculator (Doug Penrod), a home-brew microcomputer built around an Intel 8008 microprocessor chip (Larry Plate), and a "TV-Typewriter" (Grant Runyan). Brion Johnson gave a lecture on microprocessors and computer principles for beginners, during the random access period. ... Everyone that is interested in any aspect of computing/calculating is encouranged to join us at the next meeting: TUESDAY 1975 NOVEMBER 4, same place & time. If you like mathematical games and puzzles, computer history, want to learn how computers work, want to build a computer or calculator, want to learn programming- - - -any aspect of Software or Hardware- - - -this is the place to meet the people you want to talk to. In addition to informal exchange of information, help, and goodies, we expect to have talks and demonstrations by experts on occasion. We also offer advice on publications and books. (And will those who borrowed Doug Penrod's "Interface", "The Computer Hobbyist", "Micro-8 Computer User Group Newsletter", "ACS Newsletter", and "People's Computer Company" please return them!)

Present were:

Ralph Boland	131 Santa Ana Place	Santa Barbara CA	93111	805 967 1771
Denny Bollay	240 Las Alturas	Sb		963 5960
Andy Chapman	22729 Ironbark Drive	Diamond Bar CA	91765	714 956 7183
Don Cyr	800 Palermo Drive	SB	93105	805 687 6079
Bob Dolan	800A Miramonte Drive (work)	SB		965 3011
Tom Fuller	Box 13727	SB	93107	964 8217
Bill Georgiov	Francisco Torres # 731			685 2079
John Grove	282 Carlo Drive	Goleta		964 6527
Doug Hogg	2516 Castillo	SB	93105	687 9668
Jim Holmes	627? Parkhurst			967 6725
Bill Johnson	559 Chadwick Way			964 2944
Brion Johnson	1423 Alta Vista Road	SB		966 1346
Murray S. Judy	2575 N. Tiller Avenue	Port Hueneme CA		985 1982
Larry Kaempf	342 Ravenscroft Drive	Goleta		964 2203
Glenn A. McComb	210 Barranca			965 4306
Ralph McElroy	Box 507	Goleta		968 7404
Kevin McLoughlin	1033 Newton Road	SB		965 8344
Danny McNiel	1343 La Manida	Carpinteria		684 3777
Russell McNiel	1343 La Manida	Carpinteria		684 3777
Roy Moline	155 A San Angeleo Avenue			964 1339
Douglas L. Penrod	1445 La Cima Road	Santa Barbara	93101	962 3337
John Pickens	206 Ravenscroft			964 7981
Greg Pickles	766 Cypress Walk E	Goleta		963 0356
Lawrence L. Plate, Jr	2320 Skyline Way	SB		965 1466
Sue Rudnicki	312 Elwood Beach Drive	Goleta		968 1741
Grant Runyan	1146 Nirvana Road	SB	93101	962 7734
Barry Smith	235 Pacific Oaks # 205			968 0327
Eric Smith	529 Chadwick Way			967 9804
Gerry Stapleton	967 St. Mary's Lane	SB	93111	964 2739
Steven Tepper	Box 14330, UCSB	SB (alt fone 961	3888)	961 3996
Dana Trout	52 Mendocino	Goleta		968 7870
Mike Wilk	4384 Via Fresada	SB	93110	967 3045

GREAT NORTHERN COMPUTERS LIMITED

GNC KITS
BOX 114
GODERICH, ONT.
CANADA N7A 3Y5

October 15, 1975

MICRO-8 COMPUTER USER GROUP NEWSLETTER...etc

Dear Hal & John:

First, a comment on continuing the Newsletter...DO IT, PLEASE!!! There sure is a need for what you fellows are doing. First, it is a high speed way for news to get out to the hobby, and second, it provides a biased, but uncommercial comment on suppliers, techniques and standards.

The main reason for this letter is to tell your readers that the crew who did the original work on the MOD-8 at M.I.L. are alive and still in the microcomputer business in Canada. Theygo by the name of Great Northern Computers Ltd. They are supplying computers and software and system design on a commercial basis, using (at this time) an updated version of the original MOD-8. They have been prevailed upon to come up with their unit in kit form in various versions. The basic unit with 1K of RAM will cost about $450 (Can or US $), delivered in either country. When you consider the fact that Canadians have to pay 17½% duty + 12% Federal Sales Tax on everything coming into Canada, this seems a good deal for the Canadians, at least.

But because GNC usually delivers its units built-up and tested, the documentation for the kits has not been proven out by builders who haven't done it before. So, we need some help. We need some people who want to get a system going at a low cost...and are competent to help. We will want each of them to build a kit and to fill in any gaps which they think is in the documentation.(and to find any errors) To the hobbyists who are selected we will supply a kit of parts complete with two sets of our documentation (one to be corrected and sent back) for $295. This kit will have 2K of RAM and enough ROM to allow loading of programs from paper tape. There will be a paper tape of the updated Monitor-8 program, and a power transformer so that the builder can make up a P.S. This kit will sell for about $500.

We figure it will take about 15 kits to take care of this program. We want to make one thing clear - these kits will NOT be sent out on a first come, first served basis. We will judge on the basis of the letters we receive who can best help us. This doesn't mean that you have to be an electronics expert to apply, but you do have to have some savvy about the game. The kind of info we will need to judge is a little of your background, what kind of I/O's you have or can get, what test equipment you have or can get, and anything else that might persuade us.

Send the letters to me at the above address.(don't send any money) All letters will be acknowledged, and we will advise the Micro-8 Newsletter who got the kits.

Fred J. Looker

P.S. This offer is only going to the Micro-8 NL. F.L.

C.G. de Groot
Info Svce of So Africa
655 Madison Avenue
New York, NY 10021

New York, 22 August 1975.

I have been a subscriber to the Micro-8 Newsletter since last November, ever since I started toying with the idea to start building my own computer. When the prices of the 8008 came down to under $30, I finally went ahead. I decided for a wire wrap version and I finished it last sunday, but it does not work, and I don't know what is wrong with it.

My computer is basically the Mark-8 with the Sudding modifications. With the 8008 in place, the low address counter returns to 377 a few moments after I entered a number. The time varies each time it does so. When I remove IC3 from the input multiplexer, the low address counter automatically goes to whatever is on the "switchregister" without loading Low. I have switched all my 74123s and 74193s (on the address board) around, but that does not seem to work. The computer also loads 377s, no matter what is on the switch register.

However, when the 8008 is removed, I can load whatever I want into the memory and the Low Address Counter does work perfectly. I am telling you all this in the hope that maybe you have heard of such a problem and can help me immediately, otherwise I have to wait for the manual to start a systematic search.

I am interested in the Martin Research Book. Do you know by any change if this publication is available on a short term loan from anybody?

I am sorry that I have not been able to contribute to the newsletter, but my interest in electronics is fairly recent and I have not been able to gather too much knowledge yet. But when I have a brain storm, I will let you know. I am at least considering to build my own plotter and maybe a typewriter. The Xerox 800 Electronic typewriter uses a Diablo print mechanism with a print-wheel, which is much simpler than the IBM print-ball. I am very certain that building a type writer around the Diablo mechanism should be feasable and the hard copy obtained thus is much nicer than from a Teletypewriter. In any case, I will let you know when I have something more definite to contribute.

Could you let us know through the NL for instance whatever happened to the Joe Cimmino survey. I was waiting for the updated roster so I could contact fellow computer builders in NYC if any, but have not seen anything sofar.

Very truly yours,

Kees de Groot

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POSTAL ADDRESS; ROUTE 1- BOX 131- A
PRAIRIE POINT, MISS. 39353

26 August, 1975
Page 1 of 3

ATTENTION: Hal Singer & John Craig

Cabrillo Computer Center
4350 Constellation Road
Lompoc, California 93 436

Dear Friends;

In refference to your question in the recent newletter 9 concerning the future direction of the newsletter effort:

I have been in contact with Carl Helmers of the new Byte magazine, and have big hopes for this publication. It is the first ametuer publication devoted to this field with the sophistication and steam behind it necessary to provide the communications that will pace its future growth. Greens record with 73 magazine speaks for itself, and I anticipate effecient and responsive management of this publication. Carl himself is building his second homebrew system (a 6800), and so is familiar with our ambitions and trials. The only thing that bothers me about Carl is that he is evidently familiar with large machines, and has wielded large amounts of memory and used several of the lavish (memory and machine-wise) programing languages that are in vogue presently with the large machines.

It seems to me that the publication of the newsletter is quite a burden to you and John, and for many of the other amatuer efforts whose humble papers I have enjoyed. What bothers me is that, I wonder how long your efforts can continue, and how much us lucky recipients can continue to harvest, until you decide to get out from under the pile of paper and publishing scheduals, and return to your first objective, playing with your Mark 8, etc. (Or have I misjudged your goals?) Therefore, if you would like to shed some of this responsibility, as I suspect, I would heartily reccommend the incorporation of the Mark-8 news-letter into Byte magazine, and I suspect that Carl Helmers will recieve you with open arms. If, however, you are inclined to make a career or a big project out of this, you have an excellent start, and I want to be on the front row.

It appears that Carl will publish a few of the displays and the waveform photo's that I recently forwarded him on the Digital Display Unit.

I am personally opposed to the use of extensive programing languages and large amounts of memory, particularly in the amatuer effort toward home computing. One reason is that I feel the 'Big Boys' and the 'Pro-Programmers" have overrun themselves in this area, with the end results not justifying the hardware inbetween (the simplicity of programing vs. the memory required to impliment it, and the wasted machine time). (As an example, I have seen several instances where statistical data reductions were being run on large machines, when the same results could be run very efficiently on a scientific calculator, at much lower cost. I know this is a very controversial area, but I blame the programming and the programing techniques, not the machine.) Another reason is that I am afraid this approach will exclude many of the 'little guys', who will probably never spend much more that $400-500., but may contribute much to the 'microcomputer' art. Afterall, what is our objective? Is it to reproduce the 'big machines' in total, or to see what we can do with a very modest machine (home made) and a new simplicity in software?

Along the lines of a common formatt for amatuer computer enthusiasts; I believe the exchange of software programs to be an essential element for the efficient growth of this new hobby. The tremendous variety of systems, interfaces, and periphials seems to anull any efforts in this direction, and I believe the propblem is going to get worse. I believe the solution lies in the formation of a new language which would not be like the existing languages at all, but would rather be an Instruction Code Conversion Language rather than a programing assistant. If I ever get started on this effort, I'll probably work with Byte magazine on it. In the meantime, if the idea activates anyones thinking process or ambitions, please feel free to proceed!

If we collect all the basic CPU instructions employed by the variety of microprocessors available, add some of those common to larger systems, and leave room for some new ones that are sure to come along; 300 instructions should easily cover the field. Now add an additional 100 slots for the various periphials such as X-Y CRT, serial ASCII printer, serial BAUDOT printer, ASCII keyboard, DVM, etc. Besides raw data in the form of binary numbers, this is all the programer has got to work with. If our 'universal' programs were written in this format, with a designating sign to identify data and instructions, each individual could equip his system with a (8 x 400 = 3200 ≅ 4K) translating PROM that converts the Universal Instruction Code to the machime code and available input/output devices unique to his system. This system would require very little memory to operate (less than 100 bytes) in addition to the 4K PROM, except in the instance where a gross conversion might be required, as in the substitution of certain output devices (such as BAUDOT for ASCII printer, etc.)

Obviously , it will be quite a job to develop such a system, yet someone must do it sooner or latter. I am sending a copy of this to BYTE. Either of you may publish any part of this, or re-edit/write it to fit your own ideas.

Sincerely yours,

Sumner S. Loomis

Sumner S. Loomis

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28 Sept. 1975

Dear Folks;

Those wishing to work toward a synthesis of RTTY and networks of amateur or community-serive computers may want to contact Eric Dollard, 1360 Howard St., San Francisco CA 94103.

In conjunction with Resource One, Inc., a non-profit educational and charitable corporation, Eric has been assembling the pieces for a monster multiple-channel long haul HF data communications system. Components, including a 10 kw transmitter with multiple independent-sideband modulators, have come from RCA's dismantling of their overseas HF station at Point Reyes, California.

Eric has been asembling and acquiring this equipment without a definite goal in mind, pretty much because it seemed a shame to let the equipment go to waste. He has, however, no shortage of general goals, which might best be summarized as the creation of a multi-mode data communication common carrier operating in a non-profit environment. Licensing and regulation don't bother him yet — Eric is working from the bottom up.

After more than a year of work, Eric has reached the point where he needs help from others, or the whole thing will go down the drain. He needs people who can help in the development of the concept, take charge of equipment and set up sites well away from San Francisco, work with local computer amateurs in developing applications, etc.

Interested persons can write to Eric at the above address or can leave a message at (415) 864-8663. Help is needed now.

Lee Felsenstein
1807 Delaware St.
Berkeley CA 94703

ELECTRONIC CONTROL TECHNOLOGY
Post Office Box 6
Union, N.J. 07083
September 19, 1975

We have recently started a company called ELECTRONIC CONTROL TECHNOLOGY. The aim of this company is to provide the hobbyist with kits using industrial quality circuit boards as well as industrial quality components and at prices competitive with the hobbyist market.

Three projects for the ALTAIR 8800 users are presently in development and should be available soon. One project is an 8K memory board which will plug directly into the ALTAIR 8800. This should be available by early December.

Another project is an octal encoder for the ALTAIR 8800 which does not require software. Also it does not require a separate I/O board. The circuit will be on a single sided board which mounts inside the ALTAIR 8800 case and is hard wired in. The keyboard and display are separate. This should be available in late October or early November.

The third project is a TV typewriter circuit (video terminal) which plugs directly into the ALTAIR 8800. The memory will be shared between the computer and the terminal to make games or displays easily possible. The format will probably be sixteen lines of 64 characters. The availability of this circuit is not being forecast at this time.

Future circuits will not be limited to the ALTAIR 8800. We invite comments and/or recommendations for the future projects. To receive literature, availability and pricing information, as soon as it is available, or to recommend projects, write a note to me at the address below and indicate what equipment you have or intend to purchase.

Very truly yours,

Dennis P. Dupre'

Dennis P. Dupre'

ELECTRONIC CONTROL TECHNOLOGY
Post Office Box 6
Union, N. J. 07083

24 August 1975

Hal Singer
John T. Craig
Cabrillo Computer Center

AN OPEN LETTER TO MICRO-8 NEWSLETTER READERS

I really don't know how to approach this, so I guess I'll just start putting it down as it comes to mind.

Perhaps I'm just naive, but I don't understand people who make judgemental statements about systems and/or procedures without first getting involved in whatever it is they are judging. Yesterday I received all of the MICRO-8 back issues, a volume impossible to digest in a short period of time. The first pass through was a quick scan (lasting into the wee hours), stopping on key items which I'm tuned in to. Besides the good stuff, I kept hanging-up on phrases like (and this is from memory) "not worth the paper it's printed on", "toy jobbie", "a weird i/o arrangement","obviously won't be able to deliver", "using a second grade cpu chip", ad nauseaum...

I've been in computing for over 10 years. I started as a computer operator for Lockheed Missiles & Space Co. and I am presently a Senior Systems Analyst (whatever that is) for Tymeshare, Inc. (a major international tymsharing corporation). I design and implement operating system enhancements for IBM 370's. I have had no formal training in hardware, so the way look at it is; my profession is software and my hobby is hardware. Putting together digital logic is not much different than programing anyway. I have been involved in the evaluation and purchasing of numerous small, medium, and large scale computers and peripherals. Granted, these can be considered industrial purchases, but the companies are still manufacturing companies. How many of you out there have bought a new computer (DEC, DG, IBM, or whatever) "off the shelf"? Very few if any, I'm sure! Lead time is usually in months (expressed in days... 90days, 120days, etc.; IBM's lead time is frequently expressed in years: 18mo., 21mo., etc.). Now what's the gripe about MITS? I ordered an ALTAIR in January and received it in March. That's 60 days. Last year (spring 1974) I waited 5 months for a $35 Heathkit so don't give me any baloney about MITS being in a different market place than the big guys. A company (an entity endevouring to make a profit for the stockholders), is a company, is a company! They all have the same problems, raw material supply, qualified help, order quantity, etc. I personally think that MITS has done a hellova job getting a "real" computer to the masses, at an unbelievable price as quickly as they did.

My ALTAIR is serial no. 220160 (I suppose that means no. 160). It arrived in March, 20hrs later it was assembled but not working. 30min later, with only a voltmeter I found four plated through holes that were drilled out (front panel power), soldering on both sides of these wires solved the problem. My ALTAIR was running, as it still is, with zero problems. Everything works as advertized. I called MITS (Pam Hollman) about when the additional items (I ordered two 88PPCB's) would be delivered and she quoted real time - in months. They were delivered as per her quote. Can anybody ask for more?

Now I have a running computer that I can't do much with because of the unavailability of parts - but I do understand why - and I got an honest answer. What I can't understand, though, is why I have several cases of canning jars that I can't get lids for... and I know the jar lid co. has been around for a hundred years! To make my ALTAIR useful in March, I decided to live up to my title "homebrew computer freak" and homebrew-up some hardware. Which brings me to the next point...

That computer with "toy" boards and "weird i/o" just might be one of the best 8008 kits around. Look closely at the boards and you'll see very well laid-out and designed boards with plated contacts (good pictures in Sept. BYTE). I really don't know much about the 008A as a processor - seems to me it would be as good as any 8008 based system - but I know that the boards, the bus, and the power supply are all first rate designs. I know because that's how I solved my "what to do with a running ALTAIR in March" problem. The 72 bit wide bus (like the 100 bit wide ALTAIR bus) has room for everything including the kitchen sink. It's hard for me to believe that hobbyists are still buying non bus oriented computers, but, to each his own I guess.

It was a trivial job to mount the RGS backplane in my ALTAIR and wirewrap between the two busses. I've been running my ALTAIR with RGS 008A memory boards since March with no, repeat, NO problems.

Let's talk about that "weird i/o" with "no place to mount the connector". My scan through the nine NL's left my mind boggled with plea's and cry's for more 8008 i/o capability, not to mention the numerous methods printed therein. Wouldn't you say 256 i/o ports is better than 8 - plus the added convienience of input, output AND control for each port. I just can't believe some people!

WEIRD??? You should call it a God-send.

The RGS parallel i/o concept works so well, I built an interface board for my ALTAIR so I can use RGS 008A i/o boards (and of course devices if I wish). I've had full i/o capability on my ALTAIR since April. Actually more than full because of the added control function. Parallel i/o busses certainly aren't new - that's exactly how channels on IBM computers talk to devices. Oh yeah... a place to mount the RGS parallel i/o device board (I seem to remember that complaint), and to quote the RGS 008A manual (i/o supplement) "this card is designed to plug directly into the 008A computer backplane". The board has 24 holes for running ribbon cable (or whatever) via the holes or 24 pin dip socket, to the device. Pretty simple. Very well thought out. My ALTAIR now has 252 basic i/o ports and 1 channel. The channel will support 256 ports.

You know - with a full RGS 008A bus running in my ALTAIR, if I put in the 008A cpu boards, I'll have both cpu's (ALTAIR & 008A) running from the same memory, and access to the same subset of i/o devices (the parallel i/o bus). All kinds of dual processing ideas come to mind. RGS Electronics told me that they are working (feverishly) on 8080 and 6800 cpu boards for the 008A. Seems to me this means you people with 008A's needn't buy a whole new computer to upgrade to a faster cpu. It also makes my dual processor concept easily upgradeable. Also, RGS is about to offer a prom board for the 008A.

I too have a SWTP cheap keyboard, which was supplied with some bad parts. A phone call got me the correct parts within about 10 days.

By now everyone must know that MITS is coming out with a M6800 based computer. San Francisco area MITS rep said with front panel, pc board (rumor says one large flat board, flat meaning horizontal behind the front panel), and power supply for around $300 - and available in October. A movement is in progress to set standards by a group called Hobbyist Computer Manufacturers Association (Processor Technology, Godbout Electronics, RGS, Solid State Music, and a few others). If you have any opinions, you might let them know what they are. I got these two items from the Homebrew Computer Club Newsletter.

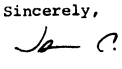
Back to 8080's & 6800's, rumors have a habit of playing one cpu over the other. I suggest anybody interested in benchmarking microprocessors, read the three part article in Electronic Design News about benchmarking micro's. They do come to some conclusions about the 8080, 6800, 2650, and others. The series is EDN April 20, May 20, & June 20.

I have some Processor Technology boards in my ALTAIR. They are absolutely superb. I also have some Solid State Music Universal / i/o Boards, containing a parallel i/p and output port, address decoding, three power supply regulator mounting positions, and the following uncommitted IC mounting positions.: 34, 16 pin; 6, 14 pin; and 2, 8 pin plus disc and electolytic capacitor mounting slots. Actually anything from 4 or 6 pin up to 40 pin devices or sockets can be mounted. Power and ground is available at each position. Very nice boards.

Guess that's all for now,

thanks for a winning publication,

Sincerely,



Jim Brick
820 Sweetbay Dr.
Sunnyvale, CA 94086

PS: It's possible that my late-nite scan misinterpreted some of the attitudes. If so, I apologize, but it doesn't change the facts... My ALTAIR is a fine machine. The BRAND-X add-on's perform flawlessly. I have NO complaints. As I said before, maybe I'm just naive...

LTC F. H. Faulkner
58 Offutt Road
Bedford, Ma 01730

MICRO-8 Computer User Group
Cabrillo Computer Center
4350 Constellation Road
Lompoc, Ca 93436

24 Aug 75

Dear Hal,

Attached is a contribution for the next issue, or whenever you need a filler.

Please send 11-page MIL cassette interface package (20¢ SASE enclosed).

It's not clear whether I qualify for more than one package of information for my entry. If so, please also send the 7-page Trent booklet (20¢ SASE enclosed) and Terry Ritter's exec package (20¢ SASE enclosed).

Please also send a copy of the Precision Systems power supply schematic by Dave Chapman (SASE + 30¢) and Joe Cimmino's MNH modem to cassette wiring diagram (SASE + 20¢)

PROJECT STATUS: I finished the TV Typewriter and it doesn't work. It gives a pattern of spots, but nothing resembling an @ symbol.

I finished my Mark-8 and it doesn't work. I made all of my own PC boards (first mistake), used Molex pins for sockets on the double-sided boards (mistake two), designed my own double-sided-with-single-sided-IC-connections memory board (# three), designed my own tri-state 8-port input bus board (four), mixed up all my ICs so I can't tell who sent me the bad ones (5), and tried to incorporate every other modification mentioned anywhere (?).

I debugged the Mark-8 long enough to find one bad IC, then put it all away for a couple of months and started reading.

I will attempt some further debugging before I scrap it all and go to wire-wrap. All further work will be done with wire-wrap when I don't use someone else's PC boards. I'm waiting for the next issue to look at Tom Boyko's version.

My next stab will probably be somewhere between Mark-8 with Digital Group mods, MIL Mod-8 and Boyko - or maybe Bill Godbout's entry, when it becomes known.

I'm not discouraged, but I'd sure like to get back in the game.

Sincerely,

HAL FAULKNER

CODE YOUR TRANSMITTED DATA by Hal Faulkner

Sooner or later many byters will want to transmit sensitive programs and data using some kind of code. The US Mail system is fairly secure, but RTTY and telephone are wide open. Commercial devices are available if you have the cash - which I don't. Following are two easy and inexpensive methods of coding your data:

One way to confuse the enemy is to arbitrarily mix up the data lines entering the output device (UART, for example). The data then gets transmitted serially in the garbled order, except the parity bit, which is automatically computed after input to the UART. At the other end, the data is ungarbled after leaving the input device. The cost can be as low as the cost of solder and heat, or as high as seven single-pole seven-throw switches. As a good cheap compromise we can use a 14 pin IC socket and seven little jumper wires. Using the full 7 bit ASCII code, there are 7 factorial equals 5040 ways of doing it. I've seen this technique used in some otherwise expensive equipment. See Fig 1a for an example.

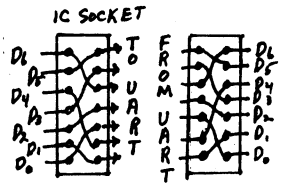


Fig 1a

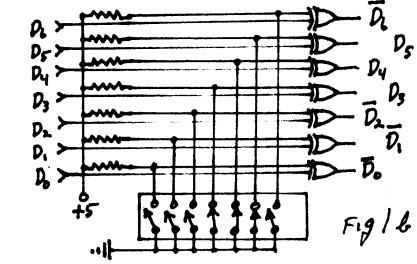


Fig 1b

A second way to code the data is to invert part of the data according to some arbitrary code. This can easily be done by exclusive ORing a code byte with the data. Example:

Let's say the data is:	1 0 1 0 1 0 1 Data
Let's say the code for the day is:	1 1 1 0 0 0 1 Code
Exclusive ORing them, we get:	0 1 0 0 1 0 0 Coded Data

At the receiving end, we run it through the same process using the same code (which we thoughtfully sent the user by mail).

Coded Data	0 1 0 0 1 0 0	There are 2^7 equals 128 combinations using this technique.
Code	1 1 1 0 0 0 1	
Data	1 0 1 0 1 0 1	Viola!

The easiest way to implement this method is by adding an Exclusive OR Immediate instruction to the program just ahead of the output instruction. The receiver will put the same instruction right after the input instruction, or after retrieval from memory later if input time is critical.

The idea can also be implemented by hardware - a couple of exclusive OR gate ICs (7486), seven single-pole, single-throw switches and pullup resistors. The SPST switches and resistors could be replaced by SPDT switches, but the $1.50 SPST DIP switches sold by B. Godbout need a home. One of these will satisfy the 'switches' requirement. See Fig 1b.

A combination of the above two coding schemes will give you 2^7 times 7 factorial equals 645,120 possible combinations. That should be enough to discourage almost everyone, even if they know the techniques we are using. Don't send anything you don't want known by the professionals. They can have it decoded before the last radio wave stops twittering. FHF

2309 Hazel Ave.
Dayton, OH 45420
(513) 254-2766

September 20, 1975

Dear Hal and John:

I have a Ph.D. degree in electrical engineering and my avocation is also my vocation. While with a previous employer I became involved in minicomputer data acquisition, analysis, and control systems (hardware and software). At that time I became interested in microprocessors. Work for my present employer allows me to design systems around the 8080. I also consult(on the side) in the minicomputer and microprocessor system design area. For my personal use I have purchased a Sphere II system. I chose the 6800 after surveying the capabilities of all the available 8-bit processors.

My time is also spread thin by teaching and by being active in the local IEEE Section. I subscribe to and faithfully read the NL, the TCH, the Digital Group NL, BYTE, Creative Computing (CC), Popular Electronics (PE), Radio-Electronics (RE), and numerous technical and trade journals. Therefore, I seem to have limited time, but I felt that I must write this letter.

First, with respect to your question: "What after NL #12?" It is my belief that the NL performs a needed and vital sounding board for computer hobbiests. No other publication performs the service that you provide and it would be a great disservice to the "community" if you were to throw in the towel. I hope that you decide to continue even at increased subscription charges.

Second, with respect to the cassette interface standard, PE and Jerry Ogdin have confused things further (their design is based on minimal hardware and maximum software). My preference is the TCH design, although it requires about 20 IC packs it appears to be well engineered, i.e. characterization of the communication channel, hardware/software tradeoffs, etc.

Third, I hope to let you know about my experiences with construction of the Sphere system. On the Altair 8800 construction, there is a very interesting one page editorial, M. Himmelfarb, "The Makings of a Mini," Digital Design, 9/75, p. 80, describing the problems he encountered.

Forth, my wife and I and a group of other people have just established a cooperative Montessori-type nursery school. I noticed recently in CC that there is a computer language, PILOT, used successfully in such an environment. Can you or anyone get me some information on this language or point me to someone who can. I might like to adapt this language to my 6800 for my own kids.

Fifth, I am also interested in computer games. I have DEC's 101 BASIC Games and am considering the purchase of PCC's What to do After You Hit Return. Are there other sources?

Sixth, if anyone is interested in algorithms for multiplication, division, fixed point, floating point, transcendental functions (e.g. exp(x), Ln(x), sin(x), etc.), etc., I might suggest some books:

1. Y. Chu, Digital Computer Design Fundamentals, McGraw-Hill, 1962.

2. D.E. Knuth, Art of Computer Programming, Addison-Wesley
   a. Vol. 1: Fundamental Algorithms, 2nd Ed., 1974.
   b. Vol. 2: Seminumerical Algorithms, 1969.
   c. Vol. 3: Sorting and Searching, 1973.

3. H. Schmid, Decimal Computation, John Wiley, 1974.

All, especially #2, are a little heavy for the novice. #1 and #3 are also hardware oriented.

Finally, I would like to get a local computer hobbiest group organized here in the Dayton area; but, as I previously expressed, I am almost saturated now. However, I believe that if I do not do something it will not get done, so I would like to test the local interest. Therefore, if anyone interested in forming a local group would send me a postcard with their name, address, phone number, and their basic interests, I would be happy to test the lay of the land and get the ball rolling. My request for postcards instead of telephone calls is because I have two children under the age of three who need their sleep and because my time is fairly well committed. I will report to the NL on the results and will announce and set up a first meeting if the results warrant.

Well, I guess that is it for now.

Yours truly,

Charles E. Burton, Ph.D.

A. W. Walker
6000 N. 27th St
Arlington, VA 22207

16 July 1975

Dear Hal & Ed,

Just received the #8 issue of the NL, and noted your interest in Dura Mach 10's after picking up one from Hal Novick. As I've had several years experience with these things from the electronics hobbyist/computer nut point of view, I thought I'd take the opportunity to send copies of some information I've acquired on them over the years.

I presently have two Mach 10's, one with an outboard Edit Control Box, which provides Character/Word/Sentence/Line/Paragraph editing and margin control similar to the IBM MTST or MCST, though using paper tape, which isn't overly convenient for large volumes of typing. However, I originally purchased the Dura's for connecting to other unit-record type ADP gear I have, and have since purchased a minicomputer, to which I've not yet completed the interface. However, interfacing between the Dura and other external devices is not difficult, be they micros, or whatever. Depending on the Dura, some will have an "Edit Control", "Aux" or "Aux. Reader" plug on the back which provides the necessary signals.

Enclosed I am sending copies of the following, feel free to distribute to anyone who wants them (Dura and Ice having been out of business for several years):

Schematic of basic Mach 10 w/ Reader, Punch & Punch Control
Maintenance Manual for Dura additions to basic typewriter
Typewriter Adjustments Manual

Please note, that the schematic is only representative, as many Mach 10 models exist, and various types of reader/punch control are encountered, some with different codes for the control functions (ie Punch On/Off, Reader On/Off, Print Supress/Restore, Etc). This schmetic is not for the machines that accept the Edit Control Box....I wish I had one! ~~If anyone is interested,~~ Also note that the Dura comes in both a relay and a more recent IC logic model. Sorry, no info on latter.

If anyone needs them, I also have, but haven't sent:

Schematic of Edit Control Box (but not for modified Dura)
Dura Illustrated Parts Breakdown for Parts added by Dura
(this is useless, unless you know someone with a stockpile of Dura parts by their old stock nos.)

I have a limited supply of scrounged Dura mechanical and electrical parts, inc. a few extra readers, punches and an Edit Ctl Box....all obtained from scrapped machines with no Selectric parts (they kept the typewriter parts)!

For additional info on the typing mech., order the following from your local IBM office as needed:

Selectric Parts Catalog/Illustrated Parts Breakdown
Form No. 241-5102
Selectric Parts Cat/Price List Form No. 241-5103
(MUST have both of above to order parts from IBM)
Type Catalog FormsNo. 241-5687
or shorter Typehead sales brochure No. G542-0053

Typeballs cost $18 each from IBM, and come in endless variations. MOST Mach 10's I've encountered use the "Correspondence" (normal typewriter) variety, but they were also made in the "BCD" code for compatibility without requiring conversion logic when on computers using the EBCDIC code. The assignment of characters to tilt-rotate positions on the typehead is entirely different between the two.

The Dura p.t. readers are designed for opaque paper tape, I use black. A former Dura CE says the sensitivity can be set down to use more transmissive pt, but at impaired reliability, which he didn't reccommend.

If any of you get a Mach 10 wired for the Edit Control (has a 37 pin Cannon female on the rear) but with no edit box, the reader won't work unless either an Edit Control or a dummy plug is inserted. The dummy is simple:

connect pin 3 to 4
" " 5 to 6
" " 7 to 8

So much for the info on Mach 10's. If I can help anyone with questions, pass my address along. No guarantee on instant response, but will try to assist.

Would also like to suggest an outfit here locally that has some used or surplus gear that may be on interest. I have some of their equipment and have been well satisfied, and they're also willingtto give refunds on anything returned if you're unsatisfied. In particular, they have some used Friden Flexowriters and Teletype 5-level paper tape readers (TD's) and punches (Reperf's) at reasonable prices. The Flexx's are similar to the Mach 10's in concept, but based on more conventional typewriter (type-basket style). They use 6 channel paper tape, include a reader and punch on the typewriter and use a code that's very similar to 5-channel Baudot (the the alphabet is identical) but with both small and capital letters and more special characters. Prices are a lot cheaper than for Mach 10's. They publish a regular newsletter, and will add to their mailing list if you write:

Colonial Mailorder Services
13 E. Spring St.
Alexandria, VA 22301

Keep up the great work on the newsletter. I'm not presently building anything with micros, as I have my own mini (Interdata 74), but am actively experimenting withinterfaces and software, and find some of the hardware ideas in your NL interesting and useful.

Regards,

Allan W. Walker

Bob Wallace, designer

PO Box 5415, Seattle, Wa. 98105

New World Computer Services, Inc.

September 16, 1975

Gentlepeople,

Ideas about your newsletter: it seems there are three catagories of info currently:

1) Reviews and feedback about current kits, newsletters, and companies.

2) General letters about what people are doing

3) Technical info - programs and schematics

My most radical suggestion is to eliminate everything in topic 3. This sort of thing could go into Byte or one of the other magazines. People submitting them would get paid, more artwork / editorial support would be available, our new hobby's slick magazine can grow, and Hal and John would have less of a load putting out the newsletter. It is these articles which tend to be long and take more energy and time to include. Seems like everyone would benefit.

On the other hand, topic 1 is very important in this new and changing field; there will be more companies starting to offer more computer hobbyist gear, and objective, trustworthy information about who is delivering and who is not will be important and the volume of such info will expand (I realize I'm a fine one to talk, since Comindex is still not out, but it will be out or money refunded by the end of 1975).

Topic 2 - general letters - would be nice to keep, as there is a community built around the Micro-8 Newsletter and letters are a good way to keep this. In addition, for topics such as standardization and hobbyist organizations Micro-8 is an excellent forum. Another value for general letters to Micro-8 is for West Coast computer hobbyists to get together.

Footnote - we need a generic slang term for "amateur computer people" or "computer hobbyists", as "ham" applies to amateur radio people. I would suggest "marks", to immortalize the kit that started it all. A mark is also a slightly derogatory term used in the carny for people who come to see the carnival acts, "Bytter" has also been suggested. This is a good field for acronym designers, too !

Sincerely,

Bob

MICRO-8 COMPUTER USER GROUP NEWSLETTER 9/15/75
Micro-8 Computer User Group
Cabrillo Computer Center,
4350 Constellation Rd.,
Lompoc,
CA 93436

Gentlemen;

I received NL #10 on 9/13/75.

I am sending you an update on the Hewlett Packard HP-65 calculator item that was in NL #8. There are at least 800 new programs(in addition to the original 2000) in the new catalog supplement according to the Spring 1975(Vol. 1, No. 4) issue of HP-65 KEYNOTE. This is the latest issue of HP-65 KEYNOTE.

According to the Aug. 1975(Vol. 2, #1) issue of 65 NOTES, as of Aug. 28,1975, the U. S. Contributer's Library had 3450 programs and the European Users Library had 1100 programs. Also, according to the same source, there are three new PACS for a total of 14 PACS. Each PAC consists of about 30 to 40 program cards in the same field(Math., Statistics, etc.). I hope that somebody brings out an interface for the HP-65 and a computer. Just imagine the HP-65 connected up to an Altair 8800(which I am putting together at present)!

Does anyone know if the extra cost of chromium dioxide tape is worthwhile for data processing?

I hope you keep publishing the NL after #12.

Yours truly,
David W. Johnston

David W. Johnston
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7 Johnson Place
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July 15, 1975

Dear Hal & John,

Rather liked Johnathan Titus's input port expansion outlined in R.E. (Dec. 74) so decided to attempt a PC Board layout. Enclosed are the diagrams of the try; top side, bottom side and composite (composite didn't reproduce very well).

The first attempt was to place all 8 ports on one board but it became too jammed and too confusing and I gave up. The second attempt resulted into two boards of 4 inputs each, similar to the output boards. Each board utilizes 8 DM 8095 and 1 7442 and contains jumpers for input port designation. The boards are outputted in parallel to port 1 of the Input Mpx Board. Modifications have to be made to the Inp. Mpx Board as outlined in Mr. Titus's article.

Two problems now remain: 1. The layout should be double checked by someone for errors and 2. Find somebody that we can send the original Vellums so some double sided boards can be made.

Thanks for the great Newsletter.

Sincerely,

Robert A. Barber

New address; Gregory A. Walker
2503 Pearl, #6
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September 3, 1975
Phone: (512) 474-7965

This is the letter I have been planning to write all summer, but the work of getting my own microcomputer projects organized has always interfered. I will try to modularize it so that you can easily edit it as needed for the newsletter.

I am coming into the computer hobby from the software side. Having recently graduated with a degree in physics, I am now attending graduate school in computer science at the University of Texas at Austin. I hope to get a local Micro-8 User Group started soon and will keep you posted on developments in that direction. It seems to me that the university would provide a large number of interested people.

I ordered a TVT-II in December of 1974 and received it in February. I had a couple of problems with shorted switches in the SWTPC keyboard, but they were promptly replaced with no charge. I built most of the TVT-II in one weekend and tested it the next--it worked the first time I tried it!! Since then, I have installed it in a 17"x10"x5" aluminum chasis with an rf generator on the output and a 24-lead for the keyboard. All considered, the keyboard works just fine. The keys are a little "mushy" in that they do not have a solid stop when completely depressed. This effectively puts an end to all speed typing on the keyboard, but then I never use touch-typing on a computer--the one-finger peck is the most error-free way I know of entering data into a computer. The $40 price for the keyboard is stiff compared to some on the surplus market. I bought it because I knew it was directly compatible with the TVT-II. Now I would probably suggest that someone should shop on the surplus market for a better deal, but I have no plans whatsoever in getting rid of my SWTPC keyboard.

My present project is to add a combination UART and FSK modem board to the TVT-II. I am constructing it with point-to-point wiring on a Veripax board as sold for $5.25 from Solid State Sales in Sommerville, Massachusetts. It is the easiest and least expensive breadboard method for DIP's that I have found yet.

I finished the FSK portion of the circuit, but was interrupted by the necessity of moving everything to return to school. I am just getting a work space set up again. The FSK demodulator uses a 565 phase-lock loop and a 339 voltage comparator in the configuration shown in the Signetics Application manual. It is calibrated with a signal generator and a scope to detect the 2225 Hz mark and 2025 Hz space of standard FSK. The modulator uses two 555's set for a 1270 Hz mark and a 1070 Hz space. I have not been to test the arrangement at data rates yet.

The modem and the UART should fit onto a single 4.5"x6.5" board. If everything goes as planned on the completion of the UART, I will write up the entire system for the newsletter.

I have chosen the MIL MOD-8 as the system to build my microcomputer around. I received Bob Swartz's data package and was very pleased with it. I was hoping he would include a circuit for a direct-memory-access control panel, and I was disappointed that he decided to go with the MIL Monitor, wherever he found a ROM with it. I ordered a set of boards, sans the TTY board #8-2, from Space circuits in July. I received them exactly one month later and am very anxious to get work with them. The postage and handling charged by SC for 7 boards was $10.00, not $2.50 as reported by Swartz. That is in addition to the $8.34 required to grease the palm of the U.S. Customs Department. I have boards for 4K of RAM and 2K of PROM and feel the MOD-8 is still the most flexible way to go in building an 8008 based machine.

NOTE: I was with Lannie Walker (no relation) at the christening of his Martin MITE-2. I will not try to get the jump on his report, but I was not at all impressed with their 50-wire ribbon cable as a bus. It is all right for a packaged system, but it appears almost impossible to tinker with.

I will build the first phase of my MOD-8 in a surplus card cage with 10 of 44-pin edge connectors. I wired up the backplane for the CPU, buffer, and one memory board in about one hour. It is very straight-forward and every line is easily available.

I joined in on Jim Fry's latest memory order for 3K, which should be enough for a starting system.

SUPPLIERS:
I would like to plug in an ad for a company few people seem to have heard of:

Tri-Tek, Inc.
P.O.Box 14206
Phoenix, Arizona 85063

I have placed two orders with them over the summer and received each in two weeks or less. They are not too heavily into IC's, but they have switches, plugs, assorted resistors and capacitors, at prices that are hard to beat. Example, a 44-pin edge connector for $0.75 versus $3.00 from Mini-Micro-Mart. They send out a flyer every so often, and while they do not stock a standard selection of chips, there are a lot of interesting devices to be found in the flyer. Check them out.

I guess that is about all to report for now. I hope this has been at least moderately interesting and even useful. I will have more detailed information to report as some of my projects move from the experimental to the operational stage.

Yours,
Gregory A. Walker
Gregory A. Walker

Dear Hal and John,
I'd like to inform newsletter readers of an interesting development in the hobby computer field. Some of the newsletter readers may have seen an advertisement in RE by sphere of 96 E. 500 So, Bountiful, Utah 84010, they have sent me their advertising literature and its pretty impressive!
I've no axe to grind so I'll just repeat some of the most pertinent features.
1) based on Motorola's M6800 faniely
2) available in kit or assembled form
3) cost 421 dollars intro package till Sept 1, 650 dollars after
4) they say they now have 3 committed orders from Universities.
5) their basic unit includes (421 kit) 650 dollars after 9/1/75. CPU with 4k dynamic RAM, 1k of EPROM with assimbly langua e operating system, power supply, back plane, CRT(TVT type) display driver 32 char x 16 lines, interconnect cables, power cables, keyboard case is not included, the CPU is fully buffered, operating m nual, and get this they supply even with units incapable of supporting it a full basic language at no extra cost.
6) this BASIC is as complete as the one on my university's time sharing service.
it has files, matrices, strings, functions besides the usual.
7) Oh I forgot the basic memory board in the 421 dollar unit is complete with 4k of RAM but has space on it for up to 16k RAM.
8) interfaces are cheap by MITS standards and they aren't offering one in the sky, they've choosen to offer an OKIDATA line printer for example and a commercial floppy disc unit.
9) they promise 60 day delivery but in a phone conversation with them, they have said I could have a unit in hand on August!!(I'm temporarily a Johns Hopkins Medical School and may be ordering thru the auspices of the Bioengineering Dept.
10) I dont't yet no what their own manuals are like but the Motorola manuals and applications literature are superb - Intels material isn't worth a glance by comparison.
11) the sphere basic requires an additional 16k of memory cost 450 dollars which is reasonable since that is the board and memory.
12) Oh I forgot the sphere card size is 14"x8" with smaller sizes for smaller functional modules.

Part 2
As you may have gathered I have held off on buying an Altair system because of these disadvantages - peripheral cost
poor documentation available
hard to design around hardware
I hope I've found what I'm looking for in the sphere unit.

Part 3
Before I left Atlanta for the summer I got together with Jim Bunion in Atlanta to see his Altair 8800 - impressive but he had been waiting many months for memory, peripheral etc. - very disappointed with MITS marketing. We'd like for other computer hobby people in the Atlanta area to contact us. The format and layout of the newsletter is great for tinders
Please follow up on Don Lancaster's TVT 3 and 4 its always interesting to see what he's got in the works.

Part 4
Has anyone ordered from processor technology - the claim to have available Altair boards and say they will make available a free BASIC language?

Part 5
I'd like to know if anyone can make available to me a M6800 cross assembler of any type.
Thanks for listering to this rambling letter.

Gary Alevy
Emory University
Box 21393
Atlanta, Ga.
30322

Yours truly
Gary Alevy

Bob and Barb Juanillo, 35360 Fircrest, Newark, CA 94560 "In issue number 10 we note one of your contributors, Neil Benson, recommends Robert Heinlein's computer-oriented tales "The Moon Is A Harsh Mistress" and "Time Enough For Love". We couldn't agree more. Every computer buff should read them -- especially "The Moon Is A Harsh Mistress". Also may we add to the list Harlan Ellison's short classic "I Have No Mouth And I Must Scream" -- about the ultimate Computer. Curl up with one of these after a hard day of debugging. We haven't begun our own system as yet. We're taking a long look before we leap. We are, however, interested in microcomputer applications in solar energy and control -- I'll elaborate on that another time. Please include us on your list of active enthusiasts."

Ron Riley, Box 4310, Flint, MI 48504 has received all the necessary parts to convert his IBM Selectric No. 71 typewriter into a teletype and should have it done in a month or so. He will send detailed instructions ASAP. He has also received a set of TI SBP0400 4-bit slice cpu. It has 512 one microsec instructions and is by far the most powerful cpu set available at this time in his opinion.

Kenneth C. Hopper, 4021 S. Bowman Avenue, Indianapolis, IN 46227 wrote way back in July and asked that the following be printed since he couldn't afford a 'new' unit and there might be some disillusioned soul who wants to back out: "ALTAIR got you down? Sell me your used 8800 and recover some of your hard earned cash - get back into computing when the smoke clears. Call (317) 787-8661"

David W. Johnston, PO Box 3781, Washington, DC 20007 read about a six volume programmed self-teaching course on microcomputers put out by Iasis, Inc., Suite 154, 770 Welch Road, Palo Alto, CA 94304. The six volumes are Binary Arithmetic, The 4-bit Microcomputer, The 8-bit Microcomputer, Assemblers and Prototyping Systems, and 8-bit Assemblers and Compilers. It is priced at $124.50. David would like to know if anyone knows how good it is?

David Price, 3901 Victoria Lane, Midlothian, VA 23113 would like to be contacted if 1) you have a BASIC 8008 or 8080 running. 2) If you can get your hands on BASIC software for any machine. 3) If you have experience with DEC EDUsystems (5-50) or Educomp ETOS.

John Cochran, 820 Orwell Ave., Orlando, FL 32809 (new address) is in the process of constructing an 8080 based unit using a MITS cpu board, Solid State Music 4K memory and I/O. He presently has 12K or memory and wants another 8K if his wife can be managed. He will use an ASCII keyboard and a TVT-II output. What he wants now is a printer or TTY for about $50.

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10021 ROBINSON, ELIOT S.
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10024 DEGROOT, C. G.
10025 BARKER, MARK
10025 SCHWARTZ, ROBERT
10028 DORF, BURTON
10028 FINSTER, JOHN N.
10028 HEUSTON, DR. DUSTIN H.
10038 CHEN, RICHARD
10301 BAILEY, ALAN S.
10305 FISCHER, GEORGE
10308 ALBANEZE, MICHAEL
10462 DALLARA, RICHARD
10467 FELBABAUM, EDDIE
10475 WEISS, STEVE
10502 BARBER, ROBERT A.
10504 FISHER JR., WM. J.
10528 SIERAD, TED B.
10541 LETT, A. S.
10583 GIVENTER, THOMAS
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10595 NOGUEROLA, ARTHUR
10605 EVER, JACOB
10703 CHRISTIE, LYNDON V.
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11234 STAPLES, FREDERICK
11368 ROBEY, CHARELS B.
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11377 FOOTE, WAYNE H.
11377 WEINTRAUB, JOSEPH
11379 RESNICK, MARTIN L.
11413 GOGEL, SIDNEY
11417 ANGUS, JOHN
11417 EHRLER, GREGORY
11553 LEVINSON, PHILIP E.
11725 METAL, DAVID
11735 SPAMPINATO, C.
11735 WOTURSKI, WILLIAM
11746 DANIELS, JOSEPH L.
11756 KELTON, DON
11779 GEORGE, L.
11784 BUSCEMI, VINCENT
11784 YULKE, DAVID
11791 SCHWEIZER, C. T.
12184 LOSEE, MARSHALL
12306 BUHRMASTER, GARY
12456 TAN, TAT SHONG
12603 LOGUE, JOSEPH C.
13041 HILLENBRAND, RICHARD
13057 THOMPSON, JOHN I.
13066 NEVILLE JR. , JOHN F.
13118 CAMPBELL, H. N.
13126 STANGEL, ANDREW
13203 GOLDBERG, MAURY
13210 MACERO, DANIEL J.
13323 PARQUETTE, TOM
13440 YOUNG, R. W.
13607 CARR, COLSON
13864 WELLES, KENNETH
14031 INZINA, RICHARD P.
14072 LESINSKI, JEFF
14120 ZIMMERMAN, CLIFFORD P.
14141 KUJAWA, KEVIN
14207 GAUSEBECK, ALAN
14212 MICHALIK, JOHN K.
14224 SZCZEPANSKI, ED
14456 RHINEVAULT, R.
14467 NIXON, WILLIAM T.
14468 PALMER, TERRY
14580 MILLER BILL
14580 WHEELER, JOHN L.
14616 HALL, RANDALL K.
14623 MAXWELL, SIDNEY R.
14623 WILLIAMS, RAYMOND
14850 DIEGERT, CARL
15202 HAYWARD, ARNOLD P.
15205 WALSH, BRIAN
15206 BEACHLEY, ELMER T.
15217 SHIELDS, D.
15218 DEMASE, A. D.
15226 CORLETT, F.
15239 SPAIN, DR. HARRY
15241 LINDSEY, MIKE
15260 BURKHARDT, WALTER H.
15342 AGORIS, D. H.
15626 CROOK, MARK G.
15946 THOMAS, ROBERT W.
16046 STICKLEY, D. W.
16101 MOLIC, STEFAN M.
16125 CARLSON, DR. NILS J.
16150 SUSI, ROGER
16601 SCHOTT, ERIC
16684 RETHAGE, WILBERT B.
17057 NICHOLS, DR. JOHN R.
17070 CARBAUGH, L. F.
17257 MILLER, CHARLES E.
17508 CLARK, DAVID W.
17584 CHALALA, JOSEPH P.
17602 REARDON, MIKE
17603 BRIGHAM, KENNETH S.
17756 OWEN, AL
17845 MAYER, ROBERT A.
18015 BASIX
18015 PARKER, JEFFRY L.
18018 ALBERT, JEFF J.
18103 HELFFRICH RECORDING LABS
18705 BUCKLER, JEROME J.
18966 NELSON, R. J.
18977 WEBER, GREGG
18979 TODD, ROBERT H.
19003 SOLOMONS, CYRIL
19007 BERKHEISER, GARY K.
19063 AMOTH, VICTOR & THOMAS
19090 KELEINSCHNITZ, A. J.
19096 GOLDMAN, DR. OSCAR
19107 MOBERG, RICHARD
19117 WRIGHT, JOSEPH T.
19120 EVEN, PAUL N.
19131 YANIR, NAFTALI
19141 STRENG, LEON A.
19145 EICHENLAUB, V. D.
19174 MAGILL, WILLIAM H.
19406 AYNAT, LUIS
19446 MARTHIAS A. MULLER
19530 RONALD K. ANGSTADT
19607 JOST, HARRY E. V.
19711 LORENZ, STEVEN
19810 GUMMERMAN, PAUL
19901 O'KAVAGE, J. A.

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20008 PEARSE, CABELL A.
20008 RUML, BEARDSLEY
20014 CARRON, DESMOND J.
20031 HOKE, JOSEPH R.
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20034 BAUM, BOBBY
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20317 ZETTLER, RAYMOND P.
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20636 HUSTON, ROBERT
20653 LINGROTH, DANIEL C.
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20740 GOEMBEL, PHILIP
20742 O'HAVER, DR. T. C.
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20770 LENTZ, PAUL
20785 GEARHART, D. M.
20854 BAKER, F. T.
20901 SOMMER, JOHN G.
20901 WINICK, STEVEN J.
20902 NOVICK, HAROLD L.
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20904 YOUNG, TOM
21043 FRANKLIN, STEPHEN
21054 SCHAUB, BENTON H.
21061 GILCHRIST, JOHN R.
21113 CARNELL, PAUL
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21207 BUSSELLS, GEORGE W.
21208 SEIDMAN, JOSEPH
21215 BIRD, JOHN
21218 HERSH, HARRY M.
21404 DAVIS, DEREK H.
21157 SCOTT, ROBERT A.
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22042 MAIRS, LEE STAFFORD
22042 WILLIS, JAMES A.
22043 WHEELER, LOUIS E.
22075 TUCKER, LARRY L.
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22091 OGDEN, JERRY
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22123 SQUIRES, M. P.
22134 BURANT, ROBERT K.
22150 DUCKWORTH, DAVID
22151 MC GONEGLE, JEROLD R.
22151 SIDENER, CHRISTOPHER
22180 CONNAWAY, JAMES E.
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22201 MAAS, JOHN E.
22207 KOEHNE, MICHAEL J.
22207 WALKER, ALLEN W.
23220 DUOSE, D. KEITH
22304 BROWN, BRUCE
22306 RUBINSTEIN, DR. R.
22307 EDWARDS, JAMES H.
22308 BEACH, ANDREW
22314 ALTMAN, F. J.
22432 CALDWELL, T. F.
23801 BRONSON, JOHN R.
22901 SCUDIERE, MATTHEW B.
23111 ALLEN, HARRIS G.
23113 PRICE, DAVID
23229 MELTON, E. HUGH
23502 PATTERSON, FRED W.
23509 SOUDRIETTE, J.
23666 GRANGER, WILLARD E.
24012 BISHOP, GEORGE H.
24060 TITUS, JONATHAN A.
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27215 MILLER, W. S.
27278 EDGELL, MARSHALL H.
27284 WITHROW, JOHN D.
27406 DRYE, DOUG
27408 SHEFFIELD, NEAL
27511 STALLINGS, STEPHAN
27514 MIRAR, ROBERT
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27609 MOELL, ROBERT W.
27609 PETERSON, DEAN B.
27909 SCOTT, JIM
27954 WARD, LESTER C.
28028 LAWSON, EMERSON
28036 ANDERS, ROBERT J.
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28202 ALLEN, JOHN L.
28210 LOHR, PHIL M.
28211 MC CRAY, HARRISON R.
28307 WARD, MACK C.
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28723 GRIESSER, DENNIS
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28806 AMBLER, CHASE
29204 GARRETT, BILLY
29205 FAUNT, DOUGLAS
29405 ULMER, RICHARD E.
29407 OTT, CHRISTOPHER S.
29501 THEOWER, G. L.

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30030 SHAMBLIN, C. A.
30033 HEATHERINGTON, DALE
30033 LLWELLYN, WILLIAM B.
30062 SWANSON, DAVID
30071 MASHBURN, A. P.
30301 YOUNG, CURTIS
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30309 EUTON, JEFFREY A.
30322 ALEVY, GARY
30324 HODGKINS, ROBINSON
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31093 HAYWARD, J.
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32215 MORTISON, WILLIAM E.
32217 VIGH, CHARLES A.
32303 HANCOCK, DAN
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32306 NALL, JOHN W.
32347 SIMMONS, STEVEN LEE

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32607 RICHTER, LAWRENCE J.
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33136 AUGENSTEIN, JEFFERY
33149 PARKS, WESLEY
33155 ALBIN, KENNETH
33157 BEHRENS, EUGENE M.
33162 NEILINGER, H. S.
33306 BALL, FREDERICK A.
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33460 CATTERALL, JOHN
33511 HOGAN, RALPH
33542 JAKOPAC, DAVID
33549 JASPER, E. E.
33552 BIELENIN, A.
33578 MAXSON, BRIAN
33604 SHULHA, GEORGE
33712 JACKSON, PRIMUS E.
33803 STEWART, DALE L.
33825 SEIBEL, RONALD E.
33870 UPCHURCH, JAMES
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35202 ROBERTSON, A. J.
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36201 LOO, LUM
36420 WALTERS, DAVID
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36609 LAND, RICHARD
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36820 BODDIE, JAMES RILEY
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37215 HILL, CLAUDE J.
37660 BUTLER, PHIL
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38105 STUDEBAKER, G. S.
38116 SMITH, B. F.
38118 CHAPMAN, DAVE
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38663 BULLOCK, KARL W.
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39759 SIMPSON, DON E.

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40207 MC COY, JOHN M.
40214 CARTER, WILLIAM B.
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43209 KNIESNER, DAN L.
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43402 BRINKER, GARY D.
43402 ENHOLM, E.

43612 FRY, JIM
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43910 SKALA, J. A.
44004 JOHNSON, GRANT E.
44070 HERFF, RON
44114 GROOME, ROBERT R.
44114 SMITH, RAYMOND J.
44116 COLEMAN, GARY
44118 WILDER, ROB
44121 LISTON, N. H.
44130 ZINGALIS, JOSEPH
44135 SZEDENITS, EUGENE
44139 CONRAD, WILLIAM
44147 SMITH, GLENN A.
44212 GOULD, JOHN R.
44223 MC NEAL, STEVE
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44870 AGSTEN, MIKE
44903 KULKA, RICHARD
45042 BURDGE, D. E.
45056 BALLARD, JAY B.
45213 JOHNSON, DON
45230 HEICK, CHARLES G.
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45243 ZIBULKA, EDWARD N.
45356 LAMPMAN, DEAN
45387 FERGUSON, A. C.
45420 BURTON, CHARLES E.
45432 BRANNON, VERN
45433 ALDRICH, C.
45433 BUVEL, RAYMOND L.
45449 SMITH, GLENDON C.
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45640 HUTCHINSON, MARK A.
45701 ADAMS, DONALD E.
46148 WASH, STEVE
46208 BOTTOMS, JOHN
46227 HOPPER, KENNETH C.
46236 DEMEYER, DEAN A.
46241 WHITAKER, R. O.
46311 SMITH, LLOYD L.
46321 BARKER, DAVID A.
46322 MOSS, L.
46328 THOMAS, WILLIAM D.
46323 SKOOG, RALPH E.
46360 MEGG
46383 BURTNER, W. H.
46526 GLEASON, HENRY
46703 HANSON, LLOYD G.
46748 MILKS, PHILIP
46804 HUGE, ARNOLD E.
47201 MILHOUSE, DAVID
47274 MORGAN, DON
47281 TALBUTT, MIKE W.
47302 BOUSLOG, S.
47401 RANDALL, JAMES E.
47546 BURGER, JOHN
47710 CLIFTON, LONNIE G.
47906 DEISS, STEPHEN R.
47906 LEWIS, CHARLES A.
47907 FREDERICK, F. J.
47907 KRAMER, GARY W.
48009 FARRELL, ROBERT
48009 MORRISON, DON H.
48013 COHEN, ERIC D.
48075 DANTO, IRWIN A.
48077 KRYSTOWIAK, DENNIS A.
48084 TYLER, JON
48103 CRAWFORD, DANA R.
48104 AMES, BILL
48104 NEWMAN COMP. EXCH.
48104 MC FAWN, L.
48104 REINHARDT, PAUL P.
48202 BORES, LEO D.
48202 FREDERICK, R. J.
48227 KLINCHER, JACK W.
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48640 ACTON, A. C.
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48823 WRIGHT, CARL
48824 KERN, ROBERT A.
48867 HERRICK, DANIEL L.
48867 LEPP, ANDREW W.
48910 SHULTZ, RICHARD F.
49008 HARTMANN, DAVID L.
49009 HUNCHARD, RICHARD A.
49017 DELEBAUGH, ROBERT
49017 RICK, JON A.
49053 S. P. V. CORP.
49083 GRANT, M. J.
F49085 FRENZEL, LOUIS E.
49107 DRISKILL, LARRY
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49423 DERKS, HARRY G.
49855 ALDRICH, RODNEY W.
49855 HORTON, TERRY
49931 MILLER, LAWRENCE D.

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50010 SOLDERHOLD, LEO H.
50010 WRIGHT, DAVID R.
50312 KELLY, DENNIS H.
51443 ARNOLD, BILL
51448 SCOTT, MICHAEL G.
51501 GERARD, WALTER E.
52306 RUSSELL, ROBERT
52402 GENTLE, JOSEPH J.
52403 SOUTHARD, C. A.
52806 CHAMBERS, L. N.
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53095 PIETRYKOWSKI, RICH
53125 SHULTIS, LARRY R.
53141 FORREST, DAVID
53186 BIRZER, DON
53201 JOHNSON CONTROLS
53201 VOITA, JAN
53206 HADNOT, DEWITT
53210 HEINDL, WILLIAM J.
53214 WOOD, DARRELL D.
53704 WILLMORE, JIM
53705 ADAMS, JOHN D.
53705 LA TOCHA, JOHN
53714 SODERSTROM, RANDY
53715 LINN, ROBERT
53933 CHAPMAN, DALE
54455 LUPIENT, ROLAND V.
54813 NORTON, MIKE
54966 REID, DALE
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55104 CHANDLER, LARRY D.
55105 ANDERSON, LEE B.
55105 YERXA, JOHN S.
55110 WHITLOCK, HAROLD R.
55112 PETERSON, IVAN R.
55121 FOGG, F. DALLAS
55331 JOHNSON, R. D.
55408 KOPLOW, RICHARD B.
55414 ASCH, PETER
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55420 BENSON, NEIL
55486 JOHNSON, ROGER
55432 COLSTROM, PERRY
55746 GORMAN, JACK A.
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56031 MARTIN, JOHN
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56233 SMITH, ALAN
56288 BERTILSON, SCOTT
56484 FOSTER, JOHN
56560 CORNER, C. R.
56716 CHRISTENSON, DAVID
57006 AAMOLD, DOUG
57006 CARLSON, STAN
57029 EPP, EDWARD C.
57105 WENSLAFF, WAYNE
57107 SANDAHL, GARY
57701 BATCHELDER, MICHAEL J.
57701 FISCHER, STEVE
58201 JOHNSON, R. I.

58201 HARRIS, TERRY G.
58704 TAYLOR, CHRISTOPHER
59538 MARTIN, DAN
59632 SIVERTS, GEORGE
59715 PATTYN, DAN

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60010 KEMPF, VERNON T.
60025 FREEMAN, WILLIAM H.
60025 GOETOVSKI, CHARLES R.
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60035 SWARTZ, ROBERT
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60068 BRENNAN, RICK
60068 BUCKLEY, R.
60076 KOOLISH, P. H.
60085 MICELI, THOMAS A.
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60115 MIDDLETON, PETER
60148 PRECHT, WILLIAM T.
60164 BUSSE, DAVID A.
60172 BARTH, OTTO
60172 KAUFMAN, J.
60181 CONTRI, ROBERT
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60201 NICE, H.
60302 NUNAMAKER, TOM
60302 PUTNAM, JOHN
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60430 NOWAK, ANTHONY V.
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60439 HOSTETLER, THOMAS
60439 ORVOSH, WILLIAM T.
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60451 MONTE, D.
60515 CONDIC, MARK A.
60481 TOMKO, KENDER
60525 ALLEN, HARRY E.
60534 DE GRAAF, EDWARD
60540 BYRNE, EDWARD R.
60540 COOK, ROBERT W.
60540 KLINE, ROBERT
60558 KAHL, FREDERICK L.
60560 HARTLEY, DON
60608 MARTIN RESEARCH
60610 SIKORSKI, J.
60610 SMITH, DAWN A.
60614 LASKO, WILLIAM E.
60614 LEBEIKO, KEN
60614 WOODMAN, ANDREW W.
60616 RADVILLAS, CHARLES
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60618 KULESZA, A.
60618 RAVER, RICHARD W.
60618 ROESKE, EUGENE D.
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60625 LOWE, GEOFFREY, D
60639 DABROWSKI, L.
60640 LAWTON, WARREN
60641 SAMARTINO, LOUIS
60647 TUPOLE, TIM
60648 ROLO, B.
60649 WALKER, CLARENCE
60659 JAFFE, DAVID L.
60690 SABELLA, R.
61764 PAGE, RICHARD
61847 BUSBOOM, RICHARD
62014 HOPKINS, STEVE
62024 DOWNS, WILLIAM
62025 RUSCH, ROGER A.
62223 SCHAEFER, ROGER
62223 STAMBAUGH, KYLE
62480 PHILLIPS, BRAD

62521 KERLIN, GERRALD S.
62704 ROMPOT, GEROGE W.
62901 ROTH, FRITZ
63017 FLYNN, DARRELL
63108 FOBES, JEFF
63031 LAMBERT, R.
63042 ACKERMAN, RICK
63111 HAMM, O. F.
63130 ELKINS, A. L.
63130 HONNELL, PIERRE M.
63130 REED, THOMAS E.
63131 TAYLOR, JOHN E.
63135 DENBOW, SONNY
63501 SMITH, DARYL
64116 MALEY, JACK
64117 BRADSHAW, RANDAL K.
64117 MORRIS, DALE
64119 LEWIS, BILL
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64030 ROBERSON, NOLEN F.
64138 SCOTT, JERRY A.
64152 ROSS, J. B.
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65201 MC KINNON, CHARLES N.
65230 SIMMONS, WILLIAM H.
65305 LOCKRIDGE, CAPTAIN W.
66102 SOUCEK, CHARLES D.
66502 YEO, IRL
66106 LADISH, ROBERT G.
66208 HENDRICKS, J. WILLARD
66109 HANCOCK, ALAN C.
66720 GOERING, KEITH
66762 CUMMINGS, ROLLAND D.
67052 MUSITANO, CHARLES M.
67212 GILCHRIST
67701 DICKMAN, GARY L.
68112 MAYCITY, LYLE C.
68113 KUSUMOTO, BRUCE F.
68123 MARTIN, RONALD G.
68420 BEHRNS, ROGER J.
68505 RUYLE, BOB
68507 PHILIPPI, JIM
68508 APPLIN, RICHARD D.
68818 ADKISSON, DALE
68978 LESLIE, PAUL

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70002 FREEMAN, HARRELL
70003 ROME, WARREN G.
70005 SHIPLEY, CHARLES J.
70053 GYERUA, DAVID
70062 FINK, LEON
70114 YOKUM, BRIAN A.
70118 SCHMIT, JAMES L.
70122 FLOSCKE, B. H.
70146 RYE, WELDON
70458 MC CARTER, W. H.
70808 WILSON, JAN R.
70815 SANDERS, HOMER
71201 HAYNES, LEVELLE
72205 WHITEHEAD, NATHAN R.
72450 HIGGINS, DAVID
73034 KEARNS, H. J.
73099 WOODS, JAMES K.
73106 DRAKE, HARLAN
73106 OSBORNE, C.
73106 YOUNG, RON
73107 HADLEY, LARRY
73145 WOLFE, REX
73801 BRADBURY, H. M.
74114 KEREKES, KIRK ALLEN
75050 FULLER, W. C.
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75080 KILGORE, DOUGLAS W.
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75211 DUCONGE, H. P.
75211 SHEPHERD, BEN
75230 ARNSTEIN, ROBERT
75231 GARRETT, JIM
75231 SWELL, ERIC W.

75234 CANTWELL, WILLIAM C.
75240 MARTIN, RICHARD
75247 KIRKWOOD, BYRON
75501 LEMOINE, SHERWOOD
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76010 CYKANA, MICHAEL J.
76010 GOUGH, BILL
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76103 PHELAN, CHARLES M.
76107 STOCKMAN, BILL
76107 CAREY, TOM
76108 FALLIS, F. NEWTON
76110 WIER, R.
76112 CUMMINGS, RICK L.
76118 PEDERSEN, E. W.
76133 GINN, C. C.
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77006 SCHMIDT, RICHARD W.
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77033 RENNIE, DAVID P.
77043 OFFMAN, GRAY
77043 MC MAHON, OWEN H.
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77550 GRIFFITHS, K. H.
77586 CASSETTI, MARLOWE D.
77586 OVERFIELD, ROBERT A.
77586 ROBERTSON, F. B.
77706 ECHARD, C. E.
77901 VALLIERE, D. O.
78201 WISE, J.
78212 THOMAS, ALEX
78227 BIELAGUS, STEVE
78704 BRYCE, D.
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78751 APPLEWHITE, HUGH L.
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79410 LITTON, FRED
79605 HANUS, DAVID R.
79701 EPTING, MARIE
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79760 RABENALDT, JOHN D.
79904 WAHL, JOHN E.
79912 COATS, JACK O.

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80206 FEMMER, M. E.
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80206 MC NEILL, FRED
80206 SUDING, ROBERT
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80210 STRUTHERS, RON
80211 REW RAYMOND
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80523 JACOBSON, LARRY S.
80820 SCHAFER, GRANT C.
80909 HENNE, LARRY
80909 KOWALSKI, GEORGE
81003 PRIGOT, J. M.
81212 FAULK, DENNIS E.
82001 FRAZIER, ROBERT R.

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88003 WAHL, JOHN E.
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89107 FIRMENICH, GILBERT
89110 ERTWINE, VON C.
89601 COX, JAY D.

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90004 CLOUTIER, LEO E.
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92010 CASSEL, RUSSELL N.
92011 GUINN, W. A.
92014 MORRIS, G. SCOTT
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93109 PLATE, LAURENCE L.
93268 PEAHL, LARRY
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94903 CALLAS, JAMES G.
94920 FISHER, A. ROBERT
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95005 LEHR, MEL
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95126 MC KEE, GERALD
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95131 ELDER, ROY
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95336 JAMES, JOHN E.
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95476 HENSEY, KENNETH A.
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92132 KASSEBAUM, JIM
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G1V 2Z8 BERNIER, J. P.
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H9S 2C4 CARDINAL GILLES
J0J 1K0 PELLETIER, J.
J4K 3Z3 RUPLE, GARY
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K1G 1R3 DILLABOUGH, DEAN
K1K 3X5 BOYLE, LOUIS
K1V 7O4 RYAN, KEITH
K2H 7A8 LANGLOIS, P.
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M9A 4M5 MELANSON, HAROLD
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N2C 1T6 ALTMAN, H. J.
N7A 3Y5 BOOKS, H. R.
R3G 2E9 KRAHMER, EDWARD
S7J 1S5 DURNIN, RON
T2L 1L7 TURNER, LAURENCE
T2M 2A2 CONN, WILLIAM F.
T2N 1Y3 SMALLWOOD, R.
T3A 0M2 TARCHUK, BILL
T3C 0R3 EARL, DAVID G.
T5M 0T3 MOREN E. N.
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T6C 0K9 DRAKE, STEVEN
T6G 2C2 MORRISON, DON
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V0E 2T0 SIVERTS, CHRIS
V0N 3E0 BARLAK, ANDY
V0X 2A0 WOLFE, PETER
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V5E 3E6 HEISE, DONALD
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